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COMPUTERWORLD

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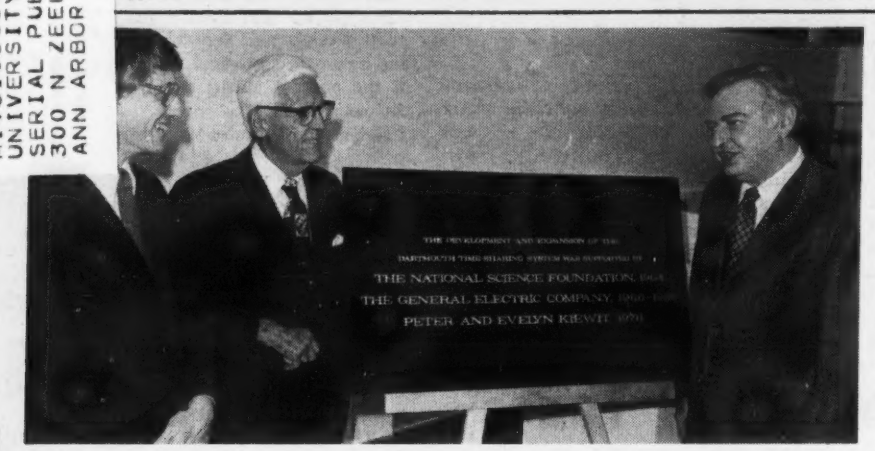

CW Photo by R. Frank

John G. Kemeny (right), Dartmouth College president, alumnus Peter Kiewit (center) and Thomas E. Kurtz (left), director of academic computing, officiate at unveiling of plaque marking 10th anniversary of the Kiewit Computation Center. The ceremony was part of a symposium on "Man and the Computer" held last week. Coverage continues on pages 4 and 5.

Drug-Tracking System Stopped; Court Rules It Violates Privacy

By John P. Hebert
Of the CW Staff

NEW YORK – Computerized systems that keep track of prescribers, dispensers and recipients of habit-forming drugs violate individual privacy rights guaranteed by the 14th Amendment to the U.S. Constitution.

Based on that decision, a federal district court here has forced this state to stop gathering information on recipients of Schedule II narcotics such as opium derivatives.

The state appealed the case to the U.S. Supreme Court whose decision is still pending although it heard the case more than six weeks ago.

While the case involves the privacy – and near-sanctity – of the doctor-patient relationship, a much broader question is at stake, observers said. That question is: Is confidential information stored in a computerized system more susceptible to disclosure than information stored in a manual system?

Computer scientists have argued the computer is "neutral." Many privacy advocates have provided evidence that it is not.

A law passed in 1972 approved the use of triplicate forms identifying the prescriber, dispenser and recipient of the Schedule II narcotics in the state's computerized tracking system.

Without the patients' names, the state has no way of knowing whether physicians, dentists and veterinarians are il-

(Continued on Page 4)

DP Charged With Warping American Political System

By E. Drake Lundell Jr.
Of the CW Staff

HANOVER, N.H. – Computers have warped the founding fathers' idea of checks and balances in the American political system, according to Dr. Frank Ryan, director of information systems for the U.S. House of Representatives.

There is a need to reexamine whether those checks and balances can still be effective in the computer age, Ryan told last week's symposium on "Man and the Computer" sponsored by Dartmouth College's Kiewit Computation Center here.

Computing and politics interact in a number of ways, Ryan explained, with computer applications affected by political decisions in many areas and the political process itself affected by computer use.

Computing and politics are similar in that both are pervasive in all areas of life, but not really well understood by the public or, in many cases, by the practitioners in either field, he said.

On the issue of political influence on computer development and applications, Ryan noted this causes the policymakers great problems since computing is not always well enough understood by the policymakers to allow them to make the necessary decisions.

But the other side of the issue is perhaps more important, he indicated.

While politics is essentially a process of compromise between competing ideas and policy choices, the use of computing in that process suggests a discipline and a science, he said.

That claim for computing is unwarranted in the political sphere, because of the human nature of the political process, he noted.

Convincing vs. Informing

Using computers for such things as public opinion analysis and selected mailings during an election campaign enhances a candidate's ability to convince the electorate while not necessarily informing it, Ryan pointed out. The distinction between convincing and informing is subtle, he admitted, but contended it is a crucial distinction.

Computers allow campaigners to tailor their mailings to selected interest groups, he noted, which emphasizes the importance of those groups, perhaps to the detriment of the general populace.

In addition, bringing computers into an election campaign – along with other sophisticated modern technology – has boosted the cost of campaigns so much that some people or elements in society can no longer afford to take an active part in the political process, he stated.

In another example, Ryan said the installation of an automated vote-counting system in the House of Representatives had also introduced some bias into the system.

The members of the House often played games with the tallying by either voting or changing their votes at the last second depending on how the tabulations were going. This resulted in chaos, he said, until the House rules were changed to eliminate the practice.

While the automated voting system has speeded up each individual vote, the House actually spends more time voting now because the system is easier to use than the older manual method and the House is taking formal votes on more issues than it would have before.

(Continued on Page 4)

U.S. vs. IBM Presses Onward With Fumbling Foray to Florida

By Catherine Arnst
Of the CW Staff

MIAMI – Florida is not only "where the boys are"; it's also where U.S. vs. IBM was last week as the antitrust trial journeyed south in one of the more bizarre occurrences in the 18-month-old trial.

Ernest Hughes, a retired IBM engineer who was instrumental in developing IBM's first computers, was on the stand. Hughes' healthy Florida tan belied any signs of illness – an illness IBM said would make him unable to travel to New York next year to testify in IBM's behalf.

Answering in a soft southern drawl, Hughes described his part in the development of several different computer systems.

The case's latest setting was a far cry from the austere decor of Room 110 in the federal courthouse in New York, the trial's permanent residence.

Miami's federal courthouse shares its roof with the U.S. Post Office. The bright blue rug in the courtroom was balanced by Greek columns and the building's grey exterior – an unusual design when viewed in the midst of the city's more typical Spanish-style architecture – all bathed in bright sunshine.

But the whole situation turned sour

(Continued on Page 7)

FCC Opens Door to Interstate Dataspeed Tariff

By Ronald A. Frank
Of the CW Staff

WASHINGTON, D.C. – The Federal Communications Commission (FCC) has opened the door for AT&T to tariff its Dataspeed 40/4 CRT terminal for interstate users.

In a notice issued late last month, the FCC called Dataspeed 40/4 service "not inconsistent with its existing computer rules" and announced its intention to "reverse" a previous decision by the chief of the Common Carrier Bureau on the matter.

That ruling found the Dataspeed 40/4 primarily a DP device which therefore could not be tariffed by AT&T for interstate use under existing commission rules.

Intrastate tariffs already have been approved for the terminal in various states.

The full text of the commission's order will be released in two or three weeks, the FCC said.

The action by the commission tied any final decision on the AT&T CRT terminal to the recently reopened Computer Inquiry which will examine the boundary between data communications and DP offerings [CW, Aug. 9].

Under existing regulations, a common carrier is prohibited from offering an interstate service which is primarily DP in nature with incidental data communications aspects. Walter Hinchman, the Common Carrier Bureau chief, had ruled certain features of the Dataspeed 40/4, such as its binary synchronous communications, buffering and clustering capabilities, were specifically designed to meet the needs of DP users.

AT&T objected to this interpretation and took the position that the Dataspeed 40/4 was merely an extension of capabilities offered for many years in teletypewriter service tariffs.

The FCC notice overturning Hinchman's decision said the "determination was made contingent on the outcome of the pending Computer Inquiry rulemaking, Docket 20828. It is intended that this docket will be subsequently enlarged to specifically address the issues raised by the Dataspeed 40/4 filings."

AT&T expects to file a tariff very soon based on the FCC's notice, a spokesman said. But a commission spokesman pointed out that the notice issued was simply a press release and any action taken before the text of the decision is available would be premature.

Although no vote will be taken until the full text of the decision is drafted by the Common Carrier Bureau, an FCC source said a majority of the commissioners are known to favor overturning the common carrier chief's earlier ruling.

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With One Case Reported

Mini Ready to Track Swine Flu Outbreak

By Ann Dooley
Of the CW Staff

ATLANTA – With only one case of swine flu reported to date, officials are divided on the potential hazard posed by the disease this winter.

Either way, the Department of Health, Education and Welfare's National Center for Disease Control (NCDC) here is using a minicomputer to track any outbreaks that might occur, according to Gordon Storr, a computer graphics programmer at the center.

But the flu surveillance system was not meant to help stop an epidemic once it has begun to spread. Once the surveillance team spots an epidemic, it will be too late to take any action such as increasing vaccine supplies because the population in striken areas probably would have already been exposed to the disease, Storr explained.

The system was designed, however, to help local health officials predict when and how severe an epidemic might be in their locales.

Statistics Solicited

About a year ago, for purposes of comparison, the center began soliciting statistics on what are considered "normal" rates of illness – or morbidity – from hospitals, laboratories, schools, state agencies and key physicians in the 50 states as well as in the World Health Organization, according to Storr.

Morbidity is represented by such factors as the incidence of absenteeism from work or school, the number of medical visits for influenza-type illnesses and the number of pneumonia deaths per week, for example.

Information is collected weekly from each of the contributing sources and stored in the minicomputer data bank. An updated surveillance report is compiled weekly and sent to health agencies and any other medical officials interested in the current status of influenza across the country.

The data base now contains morbidity information from 284 industries, 727 schools, 380 hospitals and clinics, 203 sentinel physicians, 1,408 counties and 121 cities, Storr said.

Geographic Plotting

Once this information is compiled and analyzed, the center uses a California Computer Products, Inc. 936 drum plotter to produce a map of the country that reveals any increase or decrease of viral disease compared with the norm.

Although one school or business may not realize its absentee rate is high enough to constitute an outbreak, the center can use the map to pick out overall patterns and abnormalities, Storr noted.

Using the data stored in the computer, the NCDC can trace an epidemic over a period of time as well as over an area, he added.

Besides the Digital Equipment Corp. PDP-11/40 minicomputer and the drum plotter, NCDC's system is composed of two video screens used for data input, a 130 char./sec Decwriter with four disk drives, one tape drive and a graphics terminal screen.

The national influenza surveillance team at the NCDC consists of seven doctors, two computer programmers and several office personnel, Storr said.

While surveillance operations such as this have been in effect for rabies control and some other diseases for many years, this is the first such nationwide program, he explained.

The center also was involved in the investigation of the American Legion Disease [CW, Aug. 16] when it was thought the deaths might be caused by the swine flu.

N.Y. Decides to Collect Taxes On Software, Services Since '65

By Molly Upton
Of the CW Staff

ALBANY – New York State plans to collect taxes from software vendors and DP service firms for any period since 1965, according to Paul Greenberg, secretary to the New York State Tax Commission.

Although some people would consider this a "retroactive" tax, the state does not view it that way, according to Greenberg, because the law under which the state now is declaring software taxable has been in effect since 1965.

The law was recodified late last summer [CW, Nov. 1], but is "in no sense a new law," he said.

The nature of the tax collection effort boils down to a difference in semantics. Greenberg explained there is a difference between collecting a tax owed in the past and levying a tax retroactively.

Asked why taxes were never collected if the law was in effect since 1965, Greenberg answered, "The burden of being aware of the responsibility to pay taxes rests on the taxpayer."

There is no particular program to single out any specific industry such as software, he added. Although several software firms' books have been audited by the state, that is part of the state's "normal auditing process," he said, "not a drive to uncover collectibles from any particular segment."

David Campbell, head of the New York State tax group of the Association of Data Processing Service Organizations (Adapso), said the group will request state tax authorities to define those areas considered taxable, such as contract programming.

Obtaining such definitions would be the first step in seeking new court rulings on taxation of certain DP areas, he indicated.

Currently the codification of statutes gives examples of time-sharing and contract programming, but not specific definitions, Campbell explained.

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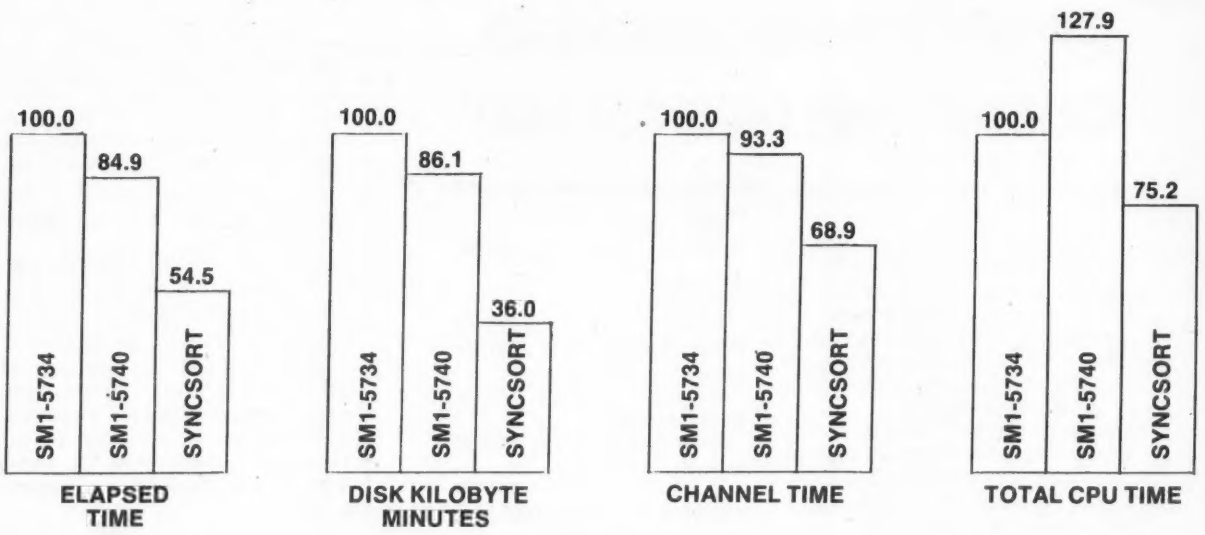

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Risks Associated With DP Should Be Studied: Davis

By Ronald A. Frank
Of the CW Staff

HANOVER, N.H. – The fact that computer privacy and security have become public issues is just the first indication that the risks associated with computer systems have not been adequately considered, according to Dr. Ruth M. Davis, director of the Institute for Computer Sciences and Technology at the National Bureau of Standards.

DPers "do not know how to tell when a computer system is not performing its intended functions or when a computer system is performing a function which was not intended," Davis said.

Until computer professionals provide scientific and technological facts about the dangers, safety, risk and cost of computer systems, these issues will be dealt with on the basis of emotion, prejudice and other nonfactual data, Davis warned at the Dartmouth College symposium on "Man and the Computer" here last week.

Looking at the risks associated with computers is a beneficial way of discussing the problems of computers, Davis said. This can be done by comparing the relative utility of computers with other alternatives and evaluating the risks associated with each approach.

Once the risks have been identified, it is possible to associate them with the cost of applying safeguards. But attempting to manage risk and determine safety is not a familiar concept to computer professionals, she said.

Areas of computer applications that appear to be in the high-risk category are large funds disbursement systems; large individual information systems such as credit reporting, law enforcement, educational records and medical records; and large public safety control systems such as air traffic control and nuclear power plant control, she explained.

Davis cited several "fictionalized" examples of specific types of risks which might be identified. The cost of health care could increase by 10% if data on ineligible claimants were to be included in a system; there might be a 25% probability that "an improperly motivated individual" could obtain enough plutonium within a year to build a bomb; and there could be a 30% probability that an individual with three credit cards would have an error in a credit record, she suggested.

Stressing these were "risk fiction scenarios," Davis said once the risks have been identified, it would become possible to assess the costs to the consumer and manager of the system and the costs of reducing the risks to an acceptable level.

But no responsible set of criteria for reducing risks which takes into account both the consequences and costs now exists in the private sector, she noted. Such risk identification would have to be tied to a widespread consensus on priorities for reducing risks, she said.

CW at Dartmouth

DP Warping Checks and Balances

(Continued from Page 1)

Computers are blurring the distinction between the branches of government envisioned by the founding fathers, Ryan said, because they are making the legislative branch dependent on the executive branch for information.

As an example, Ryan said a Joint House-Senate Committee on Taxation recently had to rely on a computer model developed and run by people in the executive branch to determine the possible effects of changes in the tax law.

Congress is far behind the executive branch in developing computerized tools to aid in the decision-making process, he said.

Because of the effects of computers in the political arena, a better understanding of the environment in which computers are placed – particularly the political environment – is necessary, he added.

If the unplanned consequences of computers in the political process are going to be eliminated, a new environmental model of the political system is needed – a new *Federalist Papers*, he said.

Court Forces N.Y. to Stop Drug-Tracking System

(Continued from Page 1)

legally prescribing or overprescribing the narcotics or unwittingly prescribing the drugs to drug addicts who go from doctor to doctor to support their habit, according to John Bellizzi, director of the Bureau of Narcotics Enforcement of the New York State Department of Health.

Under the October 1975 decision of the U.S. District Court for the Southern District of New York in Roe vs. Ingraham (now Roe vs. Whalen), the state was forced to halt use of the patient identifier on the federally numbered triplicate forms.

But the three-judge panel went one step further in rejecting the state's argument it was doing no more information gathering with the computerized system.

"The intrusion here is not only more immediate, its impact is greater," the court said.

"A name on a prescription form in the files of one of many thousands of pharmacists in the State of New York is entirely different from one's name on a form in Albany which is transferred to computerized records and stored for instant retrieval."

The court held that centralized computer systems pose a far greater potential for broadcasting damaging information than the scattered manual systems previously employed.

As such, the state's health law requiring pharmacists to give state drug authorities the names and addresses of patients receiving such drugs is "an unconstitutional interference with plaintiffs' rights of privacy guaranteed under the 14th Amendment."

New York's computerized system is used because of what was thought to be a problem of fairly widespread drug abuse by both patients and prescribing doctors.

Batch Operation

The forms are sold to the 70,000 individuals authorized to prescribe or dispense the opium derivatives, according to Irv Ovedovitz, DP supervisor for the State Department of Health's Computer Unit.

The unit keypunches the information found on one copy of the form and processes it on a Burroughs B6700 mainframe for storage on tape, Ovedovitz said.

"It's strictly a batch operation. There is very tight security on control substances systems," he said.

The system helps to spot such things as exceptions to the norm or unusual patterns of overdispensing that lead to further investigations, he explained.

But New York has been left with a system that has little advantage over the manual system it had for 50 years before computerization, according to Bellizzi. The state looks toward the patient to make a case against the practitioner, he noted.

No more cases have been made against the health practitioners than with the previous manual system because of a three-month lag in getting printouts from the system and the state's inability to use a patient identifier, he said.

An estimated 1% to 2% of the nation's doctors are engaged in the illegal sale of controlled drugs; greater percentages of doctors are overprescribing the narcotics, barbituates and amphetamines, according to James F. Hogan, the Federal Drug Enforcement Administration (FDEA)'s liaison with the states.

Three other states presently use the federal triplicate-form drug-tracking system – Illinois, California and Idaho – and Ohio is considering using the system pending the outcome of the New York case, Hogan said.

The system, Hogan noted, serves a dual purpose: it eliminates the illegal prescription of the controlled substances and makes doctors and pharmacists more aware of careless overprescription once they know they are being scrutinized.

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Despite Improvement of Systems

Ideal Division Between Man, System Still Unknown

By Ronald A. Frank
Of the CW Staff

HANOVER, N.H. – Although there have been significant improvements in the systems shared by man and computer, the ideal division of labor between the two is still unknown.

And as computer science develops, less and less advantage of the talents of human beings is being taken, according to John G. Kemeny, president of Dartmouth College.

Delivering the keynote address at a symposium on "Man and the Computer" celebrating the 10th anniversary of the Kiewit Computation Center here, Kemeny said man's expectations of perfection from computer systems are deterring the spread of computer power to a wider cross-section of the population.

The interface between man and the computer must be simplified so humans will not approach machines with apprehension, especially if they are not familiar with the technology, he said.

A higher level language is needed that can be modified to meet the requirements of the user. And while there is no known algorithm that can figure out user mistakes, it may be possible to have a language that will "grow" as the user's definitions of terms are modified, Kemeny speculated.

Higher level languages today are either too general – like Algol – and thus get little use or they are too specific. What is needed is a software package that will redefine instructions in a language like Basic "for the user's own purposes," he said.

One of the greatest disappointments of the past 10 years has been the lack of a lower cost general-purpose terminal. In fact, terminals have become more expensive in that time period, Kemeny said.

Not foreseen in 1966 were the incredible advances made in the cost and size of memory and logic. But these can only become significant if ways can be developed to manage, update and retrieve information efficiently from large data bases, he said.

The time-sharing pioneer said the emergence of the minicomputer has delayed development of national computer time-sharing networks. Minis can cut off the user from the benefits of sharing common techniques and data bases and, in this respect, the minicomputer has been "a step in the wrong direction," he said.

Kemeny said it has been a great disappointment that so few colleges have developed the computer as a tool for learning. "If you can't achieve widespread use of the computer for college graduates, how can you expect it for the general public?" he asked.

CW at Dartmouth

As for a national automated reference library, Kemeny said "regrettably, we are no closer to having one today than when that resource was first called for in 1961."

Looking toward the next 10 years, Kemeny predicted lower cost terminals will be developed along with voice I/O techniques.

Bringing the computer terminal into the home will have widespread implications for the energy problems of society, he said. The ratio of time spent traveling to work compared with useful work time will be reduced as more work is done through terminals from the home, he added.

The year 1990 looks like a realistic target when widespread home terminals will be able to access multiple national time-sharing networks, he predicted.

These national networks, however, must not become a monopoly of one single company, he warned.

FCC Prepares Way For Dataspeed Tariff

(Continued from Page 1)

Comments on the second Computer Inquiry are due on Jan. 10; several parties who had planned to file comments to the proposed rules indicated they would now have to add comments regarding the Dataspeed 40/4.

The exact impact of the FCC action is unclear to regulatory experts.

One expert commented that the FCC appeared to be involving the Dataspeed problem with the Computer Inquiry since it was a key example of the difficulty of differentiating between DP and data communications.

The wording of the FCC notice appeared to make it possible the Dataspeed 40/4 might again be rejected if the capabilities of the device were in conflict with final rules to be adopted under the inquiry.

But one Washington source said approval of an interstate tariff for the AT&T terminal would make it unlikely the device would later be "detariffed." If users had the terminal operating on interstate data communications networks, it is doubtful the FCC would rescind such an authorization, he said.

Independent CRT terminal suppliers, including IBM, have objected to the initial AT&T tariff filing. They contend it is unfair to permit a common carrier to offer a device which competes directly with nonregulated terminals supplied by DP equipment manufacturing companies.

An IBM spokesman said, "We are aware of the FCC's decision reversing the earlier decision, but we prefer to withhold comment pending more detailed information."

A spokesman for Sanders Associates, an independent CRT supplier, said "there can be no question that the Dataspeed synchronous model is a DP device and that its offering violates the spirit, if not the letter, of the 1956 Justice Department consent decree [with AT&T] and the FCC's hybrid service rules of the original Computer Inquiry."

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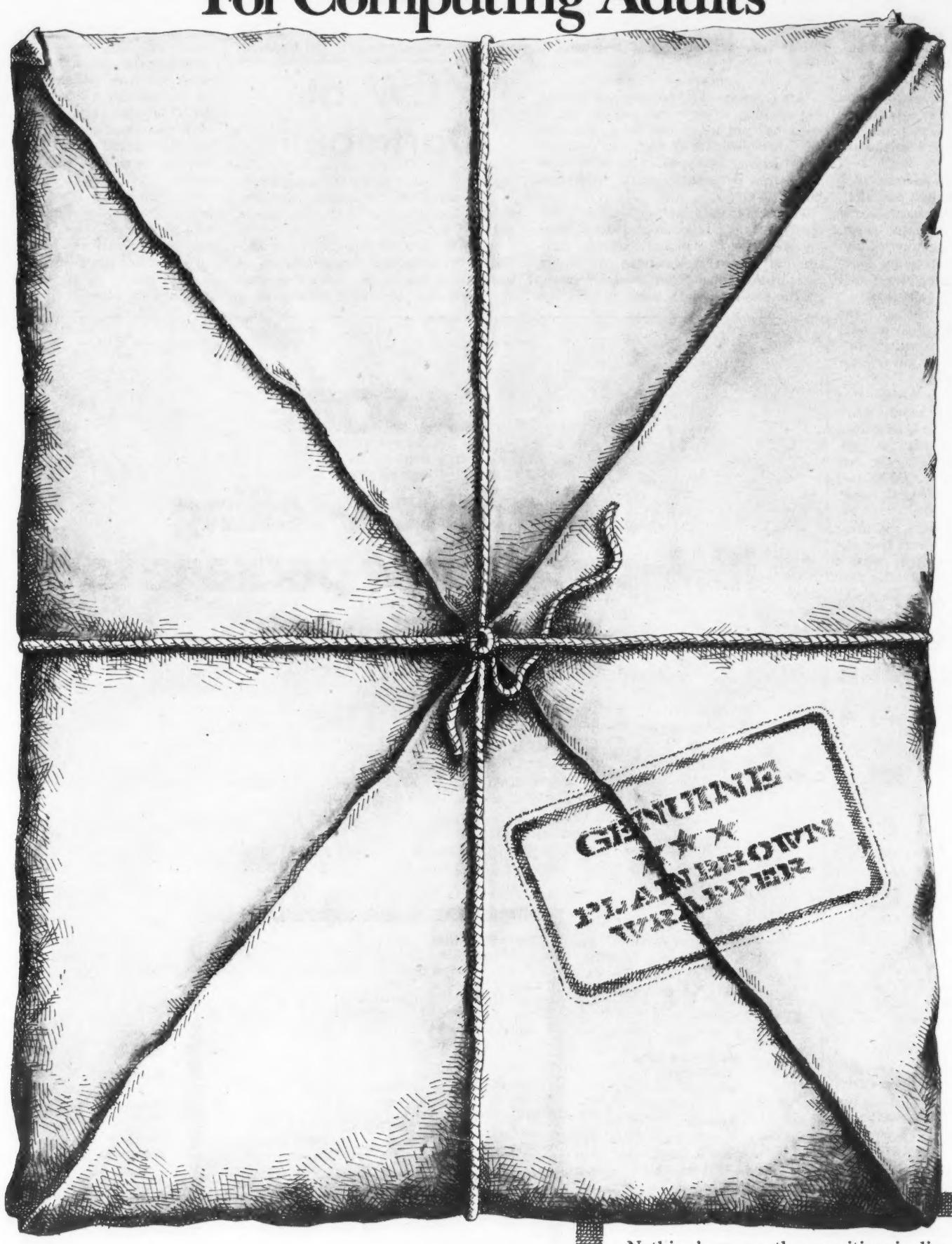

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Now Being Used at Research Sites

Terminal-Based Message Systems Seen Feasible

By Ronald A. Frank
Of the CW Staff

GAITHERSBURG, Md. – Terminal-based electronic message systems are operational in several research environments and will become commercially feasible within the next few years, according to Albert Vezza of MIT's Laboratory for Computer Science.

Speaking at a recent symposium on computer networks held at the National Bureau of Standards here, Vezza said electronic message systems use data base management principles and can be integrated with management information systems.

A message system allows a user to exchange, edit, create and send information to others connected to the system. In most existing systems of this type "a concerted effort has been made to provide a user interface that is understandable to those unsophisticated in computer lore," he said.

The message systems are more than "simple creation and delivery" operations because the addition of CPU control and data base methods make them a first step toward "office automation systems," Vezza said.

There are currently about 100 private and governmental organizations operating on the packet-switched Arpa network, Vezza said, and many of these have developed in-house message systems. Some host CPUs on the network now handle several separate electronic message systems.

"Writer-to-reader electronic message services transcend the boundary between the office environment and the delivery or postal system. Not only are messages delivered electronically, but a computational service can be provided that automates the secretary's and file clerk's functions," he noted.

But despite their promise, serious problems still remain to be resolved with these systems, Vezza said. As long as users operate within one discrete in-house system, there is no problem.

When interorganization message systems begin to operate, however, a mail system will evolve and raise regulatory questions.

Other problems listed by Vezza included security and privacy of information, authentication of messages, usability by non-DP persons, audit trails, message integrity and cost.

Current price estimates, including CPU and transmission costs, make electronic message systems too expensive for commercial applications at the present time, Vezza said. One estimate based on a system now operating on the Arpa network would price a 2,000-character message in the $4 range, but this system, called the Dynamic Modeling System (DMS), uses a Digital Equipment Corp. Decsystem-10 in a time-sharing mode.

More modern cost-effective CPUs and a system tailored to a message system would lower the cost, Vezza said. When a typical message price reaches about 60 cents, such systems will become commercially practical, he predicted.

Among the organizations active in the development of message systems are Bolt, Beranek and Newman, the University of Southern California Information Sciences Institute and Stanford Research Institute.

Such systems are now "actively" being evaluated by the University of California at Irvine, Mitre Corp., the Army Materiel Command and Naval Electronics Center.

IBM Antitrust Trial Journeys to Florida

(Continued from Page 1)

when Judge David N. Edelstein, angered by the defense's line of questioning, barked a refusal to hear testimony beyond 4:30 p.m. on Thursday afternoon.

Both IBM's attorney Robert Mullins and the government's David Hamilton agreed they couldn't finish by then.

Stalemate.

IBM has quite a few months to go before it presents its side in the case, but the defense wanted to take the testimony of Hughes now.

As an engineer hired by IBM in 1945, Hughes was one of four inventors of the Selective Sequence Electronic Calculator, a replacement for accounting machines introduced to the public in 1948. This was the first general-purpose computer system, he testified.

The next machine IBM introduced was the 650, which was opposed by a portion of the company's management as being larger than anyone would want, Hughes said. IBM projected 50 systems would be ordered, but instead it accepted from 1,500 to 2,000 systems orders, he added.

Questions 'Far Afield'

The attorneys couldn't finish their work last week because Mullins took his questioning "far afield of what had been expected," according to Hamilton, who objected time after time and finally told Edelstein the time allotted for cross-examination would not be sufficient.

Observers agreed it is difficult to determine what significance should be attached to Hughes' testimony since no other part of IBM's defense has been presented to set it in context. But it is probably a sure bet that Hughes was the most enjoyable witness the trial has heard to date.

"The affidavits provided by IBM and the physician say nothing about this witness' not being able to travel," Edelstein insisted. "If you want to finish this testimony, you'll have to do it in New York."

In addition to the judge, those traveling to Miami included two attorneys from each party, a court clerk, a court stenographer and the judge's law clerk. The cost of a round-trip coach-class airplane ticket from New York to Miami is $210, and hotel rooms here cost at least $25 per day.

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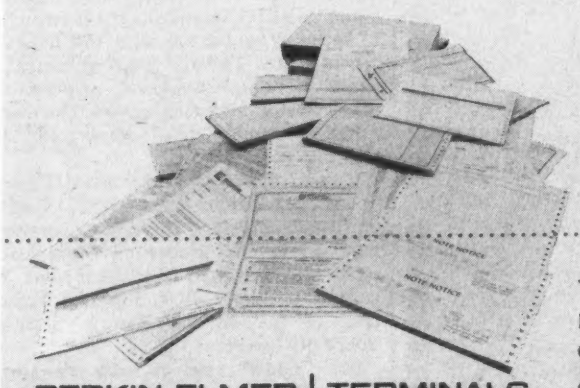

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					Geographical	Functions				Sharing		Advance Supervisory Approval
						Deposits	W D	Pre-auth Loans	A C Transfers	Like Institutions	Unlike Institutions	
COMPTROLLER OF THE CURRENCY (Revised Ruling May 9, 1975)	National Banks	N A	N A	No	Within 50 miles of main or branch office[1]	Yes	Yes	Yes	Yes	P[1]	P[1]	Notice only
ALABAMA Act 1127, Laws of 1975	Banks S&Ls CUs	L	Yes, Reciprocal only	Silent	Silent	The Superintendent of Banking may authorize activities properly incident to the business of banking						
CONNECTICUT Public Act 75-373	Banks SBs S&Ls	S	No	No	Statewide[2]	Yes	Yes	Yes	Yes	M	M	Yes
FLORIDA Chapter 75-134	Banks S&Ls CUs	U[3]	No	No	Statewide	Silent	Yes	Silent	Silent	P	P	Notice only
GEORGIA Act 169, Laws of 1975	Banks	L	No	No	Limited	◄— "routine banking transactions" —►				P	P	Yes
IDAHO Chapter 248, Laws of 1976	Banks	S	Silent	No	Statewide	Yes	Yes	Yes	Yes	M[6]	M[6]	Notice only
ILLINOIS Public Act 79-609, Laws of 1975	N A	U	N A	N A	Creates an Electronic Funds Transfer Systems Study Commission.							
IOWA H.B. 1478 Laws of 1976	Banks S&Ls CUs	L	No	No	Statewide	Transactions which are incidental to the conduct of the business of the financial institution."				M	P	Yes
KANSAS S.B. 515 Laws of 1975	Banks	U	No	No	Statewide	◄—— Banking transactions ——►				M	S	No
S.B. 519 Laws of 1975	S&Ls	S	No	No	Statewide	Yes	Yes	Yes	Silent	M	S	No
LOUISIANA Act 241, Laws of 1975	Banks	S	Silent	Silent	Adds incidental power clause allowing commissioner to authorize services consistent with services offered by banks chartered under the laws of the United States							
MAINE Chapter 500, Laws of 1975	Trust Cos SBs S&Ls	S	No	Yes	Statewide	Yes	Yes	Yes	Yes	M	M	Yes
MARYLAND Chapter 515, Laws of 1975	Banks SBs	S	No	No	Statewide (locations remote from main office or branch)	Yes	Yes	Yes	Yes	P[7]	P[7]	Yes
MASSACHUSETTS Chapter 1147, Laws of 1973	Banks SBs S&Ls	L	No	Silent	Limited	Silent	Yes	Silent	Silent	P	P	Yes
NEBRASKA L.B. 269, Laws of 1975	Banks	U	No	No	Silent	Yes	Yes	Yes	Yes	M	S	Yes
NEW HAMPSHIRE Chapter 233, Laws of 1975 (Wild Card)	Banks SBs S&Ls	L	Silent	Silent	The Board of Bank Incorporation may promulgate rules permitting any bank or cooperative bank to establish and maintain electronic devices or machines similar to those permitted by the Comptroller of the Currency for national banks.							

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Laws on EFT Systems:

These charts, prepared by the American Bankers Association, give a state-by-state overview of legislation currently in force which covers electronic funds transfer (EFT) systems.

They detail which financial institutions are covered by law in each state, the nature of a state's bank branching law (S-statewide, L-limited branching, U-unit banking) and whether and under what conditions units owned by out-of-state banks are permitted.

The charts also illustrate whether a state treats remote facilities as branches.

For unmanned remote facilities, each state is reviewed to determine if and to what extent distinctions are made between manned units such as point-of-sale (POS) terminals and unmanned units such as automated teller machines (ATM).

If a state law permits unmanned remote facilities, the law is screened to determine where it permits a facility to be located.

1. Within 50 miles sharing is permissive. A CBCT may be established beyond that distance only if it is available to be shared by local financial institutions.
2. Home office protection provided.
3. Effective January 1, 1977, banks will have limited branching power.
6. To the extent consistent with anti-trust laws, sharing is required.
7. The Bank Commissioner may establish rules and regulations for the operation and sharing of facilities to the same extent and effect as rules and regulations promulgated by the C of C with respect to sharing and operation of facilities by national banks.

Private Sector—Not Government—Should Develop

By Toni Wiseman
Of the CW Staff

WASHINGTON, D.C. – Development of electronic payments systems should be delegated to the private sector rather than to the government, representatives of financial institutions and the government argued here recently.

In testimony before the National Commission on Electronic Fund Transfers (EFT), witnesses also recommended the government only regulate privately run electronic systems instead of operating a nationwide system.

Donald I. Baker, an assistant attorney general in the Justice Department's Antitrust Division, emphasized the need for the Federal Reserve Board to make every effort to commit automated clearinghouse (ACH) operations to the private sector.

"The commission should carefully weigh the evidence that private entities are prepared to supply, on a competitive basis, the same basic services and facilities for data processing and delivery that the Federal Reserve banks currently provide," Baker said.

The very presence of the "Fed," with its potential for subsidizing its services, may deter entry by some private firms, he added.

Until the private sector takes over, there is a need for the Federal Reserve System to "translate into operating reality" its announced intention to publish a price schedule for ACH services, Baker said.

"As long as the government continues to provide services without charge, private incentives to develop alternatives will necessarily be chilled and economic resources inefficiently allocated," he stated.

Likewise, he noted, an artificially low price for ACH operations by the Fed such as one based on short-run marginal costs will encourage overinvestment in ACH-dependent services and will divert invest-

(Continued on Page 9)

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'ACH' Called More Than 'Fed'

WASHINGTON, D.C. – More often than not the term "automated clearinghouse" (ACH) is incorrectly interpreted as being synonymous with the facilities provided by Federal Reserve banks in check clearing operations, members of the National Commission on Electronic Fund Transfers (EFT) were told here recently.

In fact, the term "automated clearinghouse" extends to the activities of all of the participants and the many operations required in the processing of transfers from origination to final settlement, according to Stephen S. Gardner, vice-chairman of the Federal Reserve System's Board of Governors.

The "Fed's" role in such operations essentially parallels its role in the check clearing operation except that the payment information is exchanged on magnetic tape in lieu of paper checks, Gardner said.

In ACH operations, financial institutions create computer tapes of credit and debit items based upon customer instructions and deliver the tapes to their local Federal Reserve automated clearing and settlement facility.

A Federal reserve computer – which is also used for other operational purposes – reads, edits and balances the information on the tapes, sorts according to the receiving financial organization and makes the credit and debit entries in member banks' reserve accounts.

When the processing has been completed, the computer creates output consisting of magnetic tapes and descriptive paper listings. This output is delivered to the receiving financial organization by the same courier system used for delivering checks.

It is important to note, Gardner said, that in this entire process the Federal Reserve interacts only with financial institutions for purposes of effecting clearing and settlement.

All other organizational, operational and legal requirements are between the participating financial institutions and their customers, he said.

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13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/ Administrative Service
22 Director/Manager/Supervisor DP
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
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What's Happening Where

The charts also examine whether a facility can accept deposits or dispense cash (W/D); if lines of credit or preauthorized overdraft privileges are available through the units; and whether transfers between accounts, such as savings and checking, are permitted (A/C Transfers).

Each law is examined to determine if an establishing financial institution must share its unmanned remote facility with other institutions and whether such sharing is mandatory (M), a permissive requirement (P) or silent (S).

The laws are also categorized to show whether institutions may or must share with like institutions – banks with banks, savings and loans (S&L) with S&Ls – and with unlike institutions (banks with S&Ls).

Finally, the ABA has examined whether the governmental official with jurisdiction over financial institutions must act to authorize a facility or if only notice of intent is required.

STATE	Applies To	Branching Law	Out Of State Entry	Is Facility A Branch	UNMANNED REMOTE FACILITY							Advance Supervisory Approval
					Geographical	Functions				Sharing		
						Deposits	W/D	Pre-auth. Loans	A/C Transfers	Like Institutions	Unlike Institutions	
NEW JERSEY Chapter 148, Laws of 1975	Banks SBs	S	No	Yes	Statewide	Any business conducted at principal office				P[8]	P[8]	Yes
Chapter 159, Laws of 1975	S&Ls	S	Silent	Yes	Permits establishment with the Commissioner's approval of limited facility branch offices" which may be fully automated.							
NEW YORK Chapter 764, Laws of 1975	Banks SBs S&Ls	S[9]	Silent	Yes	Permits establishment of ATMs and POS terminals pursuant to regulations of the banking board.							
NORTH CAROLINA Chapter 553 Laws of 1975	Banks	S	No	No	Subject to the rules and regulations of the State Banking Commission, banks may establish manned or unmanned off-premise facilities.							
NORTH DAKOTA H.B. 1542, Laws of 1975	Bank of N.D.	U	N/A	No	The N.D. State Bank may establish EFT system for its customers and customers of other financial institutions authorized to utilize such services (includes State banks).					M	M	Yes
S.B. 2443 Laws of 1975 (Wild Card)[10]	Banks		Silent	No	Interstate	Yes	Yes	Yes	Yes	M	S	Yes
OKLAHOMA S.B. 590, Laws of 1976	Banks	U	No	No	Silent	Any transaction contracted for at main office				M	P	Notice only
OREGON Chapter 797, Laws of 1973 (Repealed by H.B. 2644, Laws of 1975	Banks	S	Silent	Silent	Silent except if more than 4 units	← General banking business →				S	S	Notice only for first 4 units, approval for 5th or more.
H.B. 2644 Laws of 1975	Banks SBs		Yes[11]	Yes	Silent	Yes	Yes	Yes	Yes	M	M	Notice only 30 days after installation or removal
RHODE ISLAND Chapter 290, Laws of 1975 (Wild Card)	Banks SBs S&Ls CUs	S	Silent	No	Provides that every financial institution may establish CBCTs to the same extent and only during such periods of time that competing financial institutions federally regulated and domiciled in the state are permitted to provide.							
SOUTH CAROLINA Ratification No. 375,[12] Laws of 1975	Banks S&Ls CUs	S	No	Silent	Statewide	← Silent →						Yes
SOUTH DAKOTA H.B. 644, Laws of 1976	Banks	S	Yes	No	Statewide	Business of banking				M	S	Notice only
UTAH H.B. 10, Laws of 1976	Banks S&Ls, CUs	S	Silent	Silent	MORATORIUM UNTIL JULY 1, 1977. Permits Bank Commissioner to authorize experimental EFT systems.							
VIRGINIA Chapter 535 Laws of 1976 (wild card)	S&Ls	S	The State Corporation Commission may adopt regulations defining what activities may be performed at an authorized facility which is not a branch to establish parity with federal S&Ls.									
Chapter 554, Laws of 1976	Banks	S	Silent	Silent	Limited	Yes	Yes	Yes	Silent	P	P	Notice only
WASHINGTON Chapter 166-XXX Laws of 1974	Banks MSBs S&Ls	S	Silent	No	Statewide	Yes	Yes	Silent	Yes	Bank owners M P; MSBs & S&Ls P P		Yes
WISCONSIN S.B. 415 and S.B. 828, Laws of 1976	Banks S&Ls	L	Yes[13]	No	Statewide	transactions which are incidental to the conduct of the business" of a bank or S&L.				Banks & S&Ls[14] M M; Retail owners P P		Yes

8. Commissioner may require sharing with institutions insured by FDIC or FSLIC.
9. Statewide branching in New York effective 1/1/76.
10. Establishes parity with federally regulated financial institutions, including federal S&Ls.
11. Out-of-state bank may use facility if Oregon bank may use facility in home state of non-Oregon bank.
12. Provisions of act effective until July 1, 1977 only.
13. Out-of-state banks may use a facility in Wisconsin if consent is given by a Wisconsin bank using the terminal.
14. Savings banks may share facilities established by either a bank or savings and loan association.

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Electronic Payments Systems, EFT Commission Told

(Continued from Page 8)

ment from other areas.

For example, the high front-end costs of on-line point-of-sale (POS) systems have retarded POS growth, he said. As a result, off-line POS systems cleared through the ACH systems may prove an attractive alternative.

"To the extent that government-aided ACH services are not fully priced in a manner comparable to that of private businesses, the ACH-supported service will represent an artificially attractive alternative – despite its shortcomings," Baker said.

A Fed pricing schedule should be founded upon the same economic principles as a schedule adopted by a private businessman, he added.

Baker also expressed concern over the extent to which ACHs, which he said are presently developing as monopolies, will create an environment that promotes or fosters local joint-venture monopolies offering on-line retail banking services.

The threat is a real one, he argued, urging the commission to consider appropriate measures to prevent ACHs from carrying forward their joint monopolies at the clearing level into the delivery of retail, banking and other services.

Government Work Done

Ted Baynes, president of the National Automated Clearing House Association (Nacha), stated no further government role in EFT systems is appropriate beyond its present operation of ACHs.

In his testimony, Baynes maintained that payment services should be provided primarily by the private sector and that the public sector should offer payment services only when the private sector will not offer services judged to be for the public good.

Public-sector payments services should only be offered on a fully costed basis so the private sector will not be prohibited from competing, he added.

ACHs should be dealt with separately from other EFT services, he said, because "the ACH concept affects only the media of exchange and does not involve most of the controversial aspects which are in the limelight of the EFT area today."

Nacha's position is that ACH services should not be solely dependent on or controlled by the Federal Reserve System, Baynes said. It is, however, appropriate for the Federal Reserve to provide operational facilities for local and re-

(Continued on Page 10)

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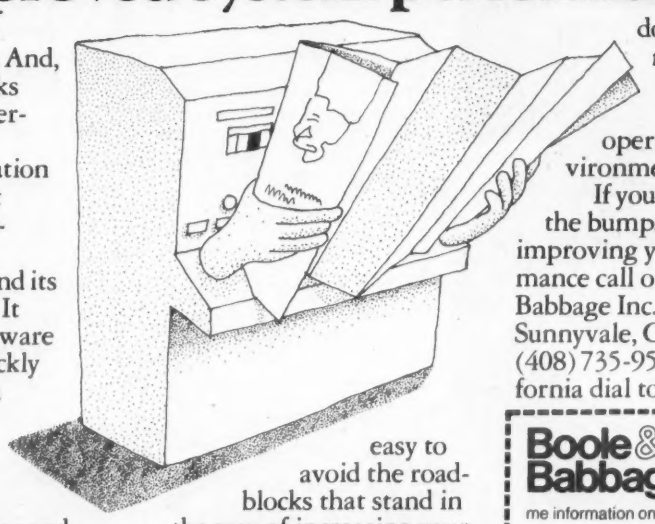

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By Nancy French
Of the CW Staff

BOSTON – The credit-reporting agency that threatened New Hampshire consumers with sale of their credit files to a giant computerized firm unless they bought back the information has been forced to discontinue the same activity in Massachusetts.

In an agreement recently filed in Suffolk Superior Court here, Wesley C. Pike, president of the Credit Bureau of Nashua, Inc., also promised never to attempt to profit by offering to sell the personal data his firm had collected on Massachusetts consumers.

In a letter Pike sent to about 2,000 Massachusetts residents, the credit bureau offered to sell back to consumers their personal information for $7.50.

The letter said, "We have a credit file which contains all or part of the following information about you . . . your employment, income, martial (sic) status, credit references, how you pay your bills, mortgages, liens, attachments, divorces . . .

"We have decided to give you a chance to obtain sole possession of your complete file before it becomes part of a large computerized data bank which may allow unlimited access by thousands of people.

"It is your privacy. The choice is yours."

The Massachusetts attorney general, who is empowered to file suit on behalf of the Commonwealth, sent Pike a five-day demand letter warning a suit would follow unless he complied with the law.

The agreement Pike signed was an "assurance of discontinuance" provided for under the Massachusetts Consumer Protection Act. That law forbids "unfair and deceptive practices," according to Jonathan Brant, assistant attorney general.

By signing the agreement, Pike did not admit liability or the violation of any law. He merely agreed to clear with the attorney general any such correspondence contemplated in the future.

A similar letter was sent to New Hampshire residents, and their complaints led to court action against Pike by that state's attorney general's office.

The Hillsborough County (N.H.) Superior Court said the letter was "in bad taste," but it found no evidence of fraud or misrepresentation [CW, Sept. 24, 1975].

Nevertheless, Pike discontinued sending the letters in that state as well.

NBS' Davis Gets Service Award

WASHINGTON, D.C. – Dr. Ruth M. Davis, director of the National Bureau of Standards' (NBS) Institute for Computer Sciences and Technology, has been named one of nine National Civil Service League Career Service Award winners for 1976.

The awards program, administered by the National Civil Service League, is aimed at recognizing career public employees for significant contributions, encouraging excellence in government service, promoting public appreciation of quality in government and stimulating youth to choose government service.

Davis has been a federal employee since 1955, when she joined the Department of the Navy as a research mathematician. Since then she has served as head of the Navy's Operations Research Branch, staff assistant for intelligence and reconnaissance in the Office of the Director of Defense Research and Engineering and as director of the Lister Hill Center for Biomedical Communications, National Institutes of Health.

Davis has been directing the NBS' computer research effort since November 1970.

Private Sector Urged For EFT Development

(Continued from Page 9)

gional automated clearing arrangements when requested by local member banks, he noted.

"We feel very strongly that considerable control in terms of rules, procedures and technical specifications must remain in the private sector in order to make the system responsive to changes dictated by the marketplace," Baynes stated.

Stephen S. Gardner, vice-chairman of the Board of Governors of the Federal Reserve System, noted the Federal Reserve provision for automated clearing facilities was not intended to preclude private-sector development and operation of similar facilities.

In fact, two privately operated ACH facilities have recently been established, both of which use the Federal Reserve's settlement systems and will use its check courier delivery system, he noted.

"The role of all participants in the electronic payments mechanism is as yet unclear," Gardner said. "The Federal Reserve has not arrived at specific positions on questions related to its role in the electronic payments mechanism."

J.T. Ellington Jr., senior assistant postmaster, U.S. Postal Service, emphasized the effect EFT would have on the Postal Service, noting almost half of its total earned revenues are derived from handling monthly bills and payments.

"We are concerned particularly with the potential for expansion of direct deposit, preauthorization, debit card usage and similar approaches that would divert valuable mail and revenues from a postal system already beset by financial problems," he stated.

He suggested the possibility of Postal Service involvement in a role conceptually akin to that which it now plays in the present system. An electronic message system would be designed to reduce the relative cost of sorting and transporting a significant portion of first-class mail.

While such a system could be structured to accommodate individual letters entered through lobby walk-in or word-processing terminals, the primary market would be mass mailings such as credit card bills entering the system in digital form.

"There appear to be no major legal or policy questions preventing the Postal Service from operating such a system, but the technical and economic feasibility of the idea has not been operationally demonstrated," he said.

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Editorial

Still Waiting...

IBM has entered the ranks of the mini makers within a carefully defined area that is meant to appeal primarily to the sophisticated, software-wise user.

The Series/1 [CW, Nov. 22] is certainly not an entry-level machine and first-time users would need heavy support from a systems house if they were entering the world of DP with one of these systems.

But IBM has put the stamp of validity on the bare-bones mini concepts pioneered by Digital Equipment Corp. The first minis, like the Series/1, were purchase-only, limited-support systems that took a lot of work on the part of the user or a systems house to make them operational.

Ironically, DEC, Data General and the other leading mini makers have now evolved into suppliers of more applications-oriented systems at the same time that IBM has put its stamp of approval on their original concepts.

The Series/1 was unveiled with limited capabilities and as such will appeal to a limited type of user – at least for now. But the Series/1 will undoubtedly be enhanced upward as IBM decides what features should be added and when.

The architecture, with 16-bit word and byte addressing plus a large instruction set, implies this machine (with proper software) could someday become a large-scale mini, custom-tailored for teleprocessing or other major applications.

For now, the Series/1 is playing catch-up ball in a new IBM ballpark. But, as usual, IBM is on the pitcher's mound on where it will take this system.

And now that the wrappers are off, we have still not seen the simple entry-level business-oriented IBM system. That role may have been reserved for the System/32.

If not, perhaps one day in the not-too-distant future, advanced users of IBM word-processing equipment may get an upgrade into System/0, which might be called Everyman's entry-level introduction into the mysterious world of data processing.

'Deal Me In, Gentlemen . . . '

Letters to the Editor

EFT Question Posed by Editorial Permits Only Negative Answer

The editorial of Nov. 15 posed the question: "Is it consistent with the right to privacy to collect all information about an individual's financial affairs in one place?"

The question was raised in the context of electronic funds transfer (EFT) technology. The editorial stated that until that question can be answered satisfactorily, Congress should place a moratorium on all EFT experiments.

Clearly, the question only permits a "no" answer and that answer is not satisfactory. However, for it to be relevant to the issue of EFT, one must assume EFT will result in all information being in one place.

To hold that this would be the inevitable or even the probable result, one would have to be very naive regarding the technology itself, the banking system and information systems.

"EFT" is a broad umbrella that describes a number of applications. The use of the umbrella term seems to contribute more to fear than to understanding since few of the dangers attributed to the umbrella seem appropriate to the individual applications.

If the various applications share anything in common, it is that for security they depend upon the fast flow of current information rather than upon such primitive mechanisms as checks, credit cards, passbooks, tokens and bank notes.

Like the primitive technologies, EFT will provide security with some residual risks. The new technologies can be expected to replace the old only partially and only to the extent they are successful in reducing risks.

In the end, we will have more mechanisms, not fewer. Bank notes did not replace coins, checks did not replace currency and credit cards did not replace checks. The increase in mechanisms will increase the individual's tools and choices for maintaining his privacy.

The U.S. banking system, and indeed that of the world, is also pluralistic. Banking institutions are chartered by many jealous sovereigns, each determined to maintain its own control. The Federal government alone charters four different kinds of banking institutions: Federal Reserve banks, national banks, federal savings and loans and federal credit unions, not to mention regulatory and insurance agencies.

The trend seems to be in the direction of increased competition among these institutions. Many people who formerly dealt with only one type of institution now deal with two or more and often more than one of each type.

I am all for dialogue, but this one has already been long and somewhat one-sided. I am for safeguards, but let's not fail to implement those required for today.

W.H. Murray

Norwalk, Conn.

Command Incorrectly Converted

In his article [CW, Nov. 15], M. Curtis Stordahl incorrectly converted PL/I's DO WHILE C into Cobol's PERFORM NEST-4 UNTIL C. The correct Cobol equivalent is IF NOT C THEN PERFORM NEST-4 UNTIL NOT C.

A better solution in the future would be to permit inline block structures in Cobol via the DO and ENDDO and, possibly, the DOWHILE constructs.

Larry Kintisch

Spring Valley, N.Y.

(Other letters on Pages 14, 15 and 16.)

Data Past

Five Years Ago
Dec. 8, 1971

WASHINGTON, D.C. – The American Committee on Africa announced computers were "the key U.S. contribution" to South African apartheid. The committee, which called itself a "support group for the liberation movements in southern Africa," said a computer system would be used to compile dossiers on all blacks in South Africa.

– – –

WASHINGTON, D.C. – Criminal justice agencies in "about 10 states" went on-line with the Computerized Criminal History (CCH) file of the FBI, according to an official here. These agencies included police, courts and corrections institutions.

The CCH increases the likelihood of obtaining "last minute" criminal data instead of obtaining records of arrests without dispositions, he said.

Eight Years Ago
Dec. 11, 1968

STAMFORD, Conn. – Using a Type 3 IBM software package on a single processor 360/67, a time-sharing service here was able to give its users more memory space for programs than the internal capacity of the system. The service, operated by Computer Software Services (CSS), was capable of running programs requiring up to 16 million bytes even though it had only a quarter of a million bytes of core storage physically available.

– – –

SAN FRANCISCO – Thomas J. Mellon, this city's chief administrative officer, announced election day errors in computerized vote tabulating had been traced to human error. "The breakdown came during the process of converting the results from the voting machines to the scanner sheets," Mellon said.

Personal Initiative Seen Key to DP Career Growth

By Jack Stone
Special to Computerworld

First, a note of appreciation to the many respondents who answered my survey on the status of women on DP staffs [CW, Oct. 4]. The high volume of comments has made it impossible to acknowledge each letter individually. However, extracts of selected letters will be published, along with an analysis of the survey, soon after the questionnaries stop arriving.

After reading the letters and comments that have already been received, I noticed one particular theme was recurrent and consistent: Any individual, man or woman, armed with driving initiative, strong desire and the willingness to work hard and long can enter, grow and prosper in most DP positions.

The exceptions are those positions for managers where the competition is keen and those positions for highly technical people where specialized education and training are required.

A fine example of such a successful career program is portrayed in the following letter from Martha Collaer, who made the transition from clerk-typist to DP manager.

Dear Jack:

As a female DP professional of some 15 years, the idea of your survey was of great interest to me; and I feel my observations may be of equal interest to you.

First of all, I will make the general statement that in the computer industry, as well as in most other industries, women do not have an opportunity equal to that of their male counterparts.

On the other hand, they may well be more equal in DP than their sisters in other professions. I know of few women in other areas of business who can hope to achieve the income level of the female DPer.

Superior computer programmer/analysts are in great demand, regardless of sex, and a female who is able to achieve this kind of reputation is going to make a better than decent living.

To move into management is quite another thing. Those walls are still fairly secure, the reason being that a woman comes into head-to-head competition with the very best of the male professionals and, all other things being equal, the male has the edge.

In my somewhat long experience, I have had two management positions. In both instances part of the reason I was able to secure these jobs was the fact that my experience and ability were far, far superior to that of my male competition at the same salary level.

To have hired a man with my qualifications would have cost the company at least 35% to 50% more. (My income over the past few years has placed me in the upper 1% of salaried females, according to a survey in *Business Week*).

At the level of programmer or systems analyst, however, I feel women can demand and obtain equal pay for equal work.

As to your question; whether I feel the secretarial staff is a viable source of personnel for junior DP positions, my answer is maybe. As a DP manager in a relatively small shop, I certainly would have given this opportunity to any clerical female in the company; and yet not one female employee in the organization ever showed the slightest interest in a DP position, even when openings existed.

The Human Connection

Not even within my DP department, where my secretary and clerical employees were encouraged, even pushed, was there much indication that these women wished to learn to program or operate the computer, except at a highly supervised level.

I graduated from college in 1959 with a degree in government and English. I went to work as a clerk typist for $275/mo. I was not satisfied with that because I knew I had more sense than most of the men for whom I worked.

When new positions opened, I requested that I be considered for promotion; if I wasn't, I went looking for another job. I begged to learn new things and I worked long and hard at work I was not being paid to do.

During the first three years of my working life, I was working beyond my responsibilities and was receiving low pay. I took advantage of every opportunity to learn.

My entry into DP was accidental: the young man who was my supervisor didn't want to learn our old unit record equipment; the woman with seniority didn't want to stand on her feet all day; and I was willing to try anything once.

And so, my advice to secretaries is this: If you think you would like to learn DP, go to the DP manager in your firm and ask to take an aptitude test. If he won't give you one, get one from a vendor or an employment counselor or at a school.

If you pass the aptitude test, tell the DP manager you would like very much to transfer into the DP department at the very first opportunity. If that is not possible in your organization, find another organization where it is possible; leave no stone unturned.

Then work, work . . . learn, learn. Be willing to stay late, volunteer for every job. I guarantee you will prove yourself indispensible and then you will be on your way.

No manager in his right mind would deny this kind of employee a chance to grow. And if you think it's tough now, you should have been there in 1960.

For every 20 or so employers who will not give women a chance, there is one who might. Find him.

Martha Bullock Collaer
Amarillo, Texas

Letters outlining questions, issues or situations pertinent to human relations in the DP setting may be addressed to Stone, c/o Computer Education International, Inc., Suite 222, 2233 Wisconsin Ave. N.W., Washington, D.C. 20007. Please include self-addressed stamped envelope if acknowledgment is requested.

Another Security Approach Steps Beyond Passwords

One of the strongest objections to data base operations has been the almost total failure of any "password"-based security system to be much more than an avoidable accounting operation.

Security of data has been practically relegated in such systems to relying upon ineptness of thieves and complexity of storage accesses – a security which is doomed to failure as time goes on.

The Taylor Report
By
Alan Taylor, CDP

A more thorough type of security, particularly designed for relational data bases but apparently usable elsewhere, has been suggested by Patricia P. Griffiths and Bradford W. Wade of IBM's San Jose Research Division.

Their system ("An Authorization Mechanism for a Relational Database System," *ACM Transactions on Data Base Systems*, September 1976) asks the data base users to set up authorization rules whenever they set up a new table. This is in direct opposition to having some data base administrator set up the rules.

Moreover, the user-provided rules can provide for subsets of the data base itself that can be used by particular users, as well as put restrictions upon the type of use the first user can have.

'Viewing' Method

Segmentation of the data is handled through "viewing." A "view" of data is not physically stored, but can be computed from the stored data. For instance, a view consisting of the names and salaries of the employees who work in the toy department can be defined as:

```
SELECT NAME, SALARY
FROM EMPLOYEE
WHERE DEPARTMENT = 'TOY'
```

This particular view permits copies of actual data to be provided, but manipulation of the instructions can restrict the data to statistical summaries. For instance, a view defined as:

```
SELECT AVG(SALARY)
FROM EMPLOYEE
GROUP BY DEPARTMENT
```

would provide the data to be published – average salaries by department – but not the data used in preparing the view.

The method the table-builder has of authorizing access to the tables is through GRANT and REVOKE commands. In the first place, the person setting up the table is the only person who has the right to say how it should be handled. Everyone else is excluded; it is his private domain.

With this set firmly as background, he can use five types of rights to user lists and can permit delegation of the GRANT provision itself. A GRANT command can look like:

```
GRANT READ, UPDATE, DROP ON
(table) TO (user-list)
WITH GRANT OPTION
```

READ permits access to the table or some of its views; UPDATE allows the person getting update privileges to modify existing data; DROP permits the grantee to actually delete the table from the system. INSERT and DELETE are the other two available commands, allowing the insertion or deletion of rows from the table concerned.

Granting views is similar, but not identical, to granting access to actual tables. Again, the basic theory is that only the person who sets up the view can have access to the view or can grant others such access.

However, as a view is set up from one or more tables in the first place, the person who has set it up needs a second user and not the original table-creator. As such, he can't grant authority that he himself doesn't have.

If a view is related to two tables and the view-creator has read-only privileges on only one of those tables, then the most he can grant is the same read-only privilege – no matter how widely he is authorized for the other table.

Here, also, the last phrase of the GRANT command comes into play – WITH GRANT OPTION. Unless this option has been provided on all underlying tables, the creator of a view can't do any granting.

An oddity here is that a user who has been granted a view need not have access to the underlying tables. This way the grant-option permits such secondary use of otherwise inaccessible material without further authorization and has some of the aspects of the need-to-know security theory built into it.

```
REVOKE: procedure(grantee, privilege, table, grantor);
  comment turn off the grantee's authorization for (privilege) obtained from (grantor);
  set (privilege) = 0 in the (grantee, table, grantor) tuple in SYSAUTH;
  comment find the minimum timestamp for the grantee's remaining grantable (privilege)
    on (table);
  m ← current timestamp;
  for each grantor u such that (grantee, privilege, table, u, grantable) is in SYSAUTH do
    if privilege ≠ 0 and privilege < m
      then m ← privilege;
  comment revoke grantee's grants of (privilege) on (table) which were made before time m;

  for each user u such that (u, privilege, table, grantee) is in SYSAUTH do
    if privilege < m
      then REVOKE(u, privilege, table, grantee);
  return
```

Implementation of the authorization system of System R is performed through algorithms controlling the various commands. The one above handles the REVOKE command.

System R

The system is being implemented by Griffiths and Wade in a relational data base, System R, currently under development. Clearly it can be expensive in time (see accompanying diagram of the revocation algorithm).

Some savings of time are possible by noting authorization is frequent, but revocation is rare – which suggests checking that the rights of a user have not been revoked has a low return, in the sense of few rejects.

In System R, this is being faced by permitting access based on transactions, rather than on individual data accesses. In System R, a transaction is defined as a group of commands to the user interface.

Within any particular transaction, when the first access to a table is requested, the right of the user is checked including revocation. The results are placed on a scratchpad and used for any subsequent access to the same table, within the same transaction.

Misdirected Step Ahead

All in all, the Griffiths-Wade system is a definite step beyond passwords, but it falls woefully short of today's needs and, to some extent, appears to be misdirected. It doesn't, for instance, record who has accessed what – a vital requirement for today's privacy systems. Nor does it record just how a particular user gained access to some data.

True, the authors noted they do not try to protect information from misuse by authorized users just passing the data on, but whether this acknowledgment is enough warning to potential believers that System R really does provide secure data is, in my eyes, doubtful.

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Letters to the Editor:

Schecter's Premise Basically Incorrect

Computerworld really should be more careful. Apart from several typographical errors in the enumeration of Julian dates by David Schechter [CW, Nov. 8], the basic assumptions of the article were wrong. I do hope no one has already programmed it.

There are not a fixed number of days in a century. The 20th century has only 36,500 plus 24 leap-year days (not 25), since 1900 is not a leap year.

This is because there are 365.242 days in a year and the adjustment of one day every four years requires an adjustment itself every 400 years. Thus 1600 and 2000 are leap years, but 1700, 1800 and 1900 are not.

Schechter's formula thus requires the constant subtraction of .25 in each calculation to give correct answers. Correct, that is, except for all dates in 1900 for which it gives a wrong answer (the day number 365, indeed, is impossible with this algorithm).

More accurate is the formula:

yy * 365.24 + ddd (as opposed to (yy * 365.25) - 0.25 + ddd)

But even better (albeit tongue-in-cheek), as we all try to write programs for posterity as well as prosperity, would be

(yyyy - 1973) * 365.25 + ddd (taking Jan. 1, 1973 as day 1)

which would work until Dec. 31, 2100, by which time we all should be past caring.

Brian Lewis

Vienna, Austria

Another Alternative

Edward C. Imperatore [CW, Nov. 22] realized there aren't 25 leap years in a century, but his modification of David Schechter's five-digit number (FDN) formula did not use that knowledge properly.

The FDN formula still will not work in the 21st century because it stated Jan. 1, 2001 and Dec. 31, 2000 are the same FDN (00366).

Donald J. Ramig realized Schechter's FDN formula wouldn't work in the 21st century, but he didn't understand why. Ramig's seven-digit number (SDN) formula doesn't work in the 20th century; there seems to be an extra day between Dec. 31, 1900 (SDN=0694339) and Jan. 1, 1901 (SDN=0694341). This error, if accumulated for 10,000 years, would become 75 days.

Larry Runtsch showed his knowledge of date-handling methods and an understanding of why Schechter's FDN formula won't work in the 21st century. He went on to tell they've invented a date called Mega which converts July 4, 1976 into 721,905 and that this date transcends both years and centuries and can easily be used to calculate elapsed days and the day of the week.

With all these people trying to help develop a date numbering technique for our calendar which would allow us to do simple elapsed-day calculations, I decided to give it a try.

I started with the rules for our Gregorian calendar which are: every year has at least 365 days, every fourth year is a leap year (has one extra day) and every centessimal year not divisable by 400 is not a leap year.

From this I wrote:

Date Number (DN) = INTEGER (YEAR * 365 + YEAR * 24/100 + (YEAR -1)/400) + DDD

which reduced to:

DN = INTEGER (YEAR*365.2425-.0025)+DDD.

The DN produced for July 4, 1976 becomes 721,905 which is the same as Larry Runtsch's Mega date.

John David Dilks Jr.

Formula Wrong by 1

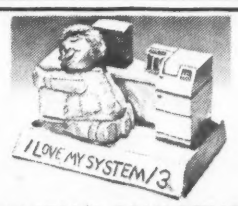
The minor storm stirred up by David Schechter's proposed five-digit number (FDN) attracted my attention. As was pointed out by other readers, there are 97 leap years every 400 years according to the Gregorian calendar, and we will probably abandon the entire system for other reasons.

The thing that caught my attention is that Schechter's formula simply does not work for the year 1900. According to his formula, Jan. 1 has an FDN of 0 and Dec. 31 has an FDN of 364. It does, however, give the correct value from Jan. 1, 1901 to Dec. 31, 1999.

Further, the formula, even with the correction proposed by Edward C. Imperatore, will be in error by 1 throughout the 21st century.

James F. Keegan

Paramus, N.J.



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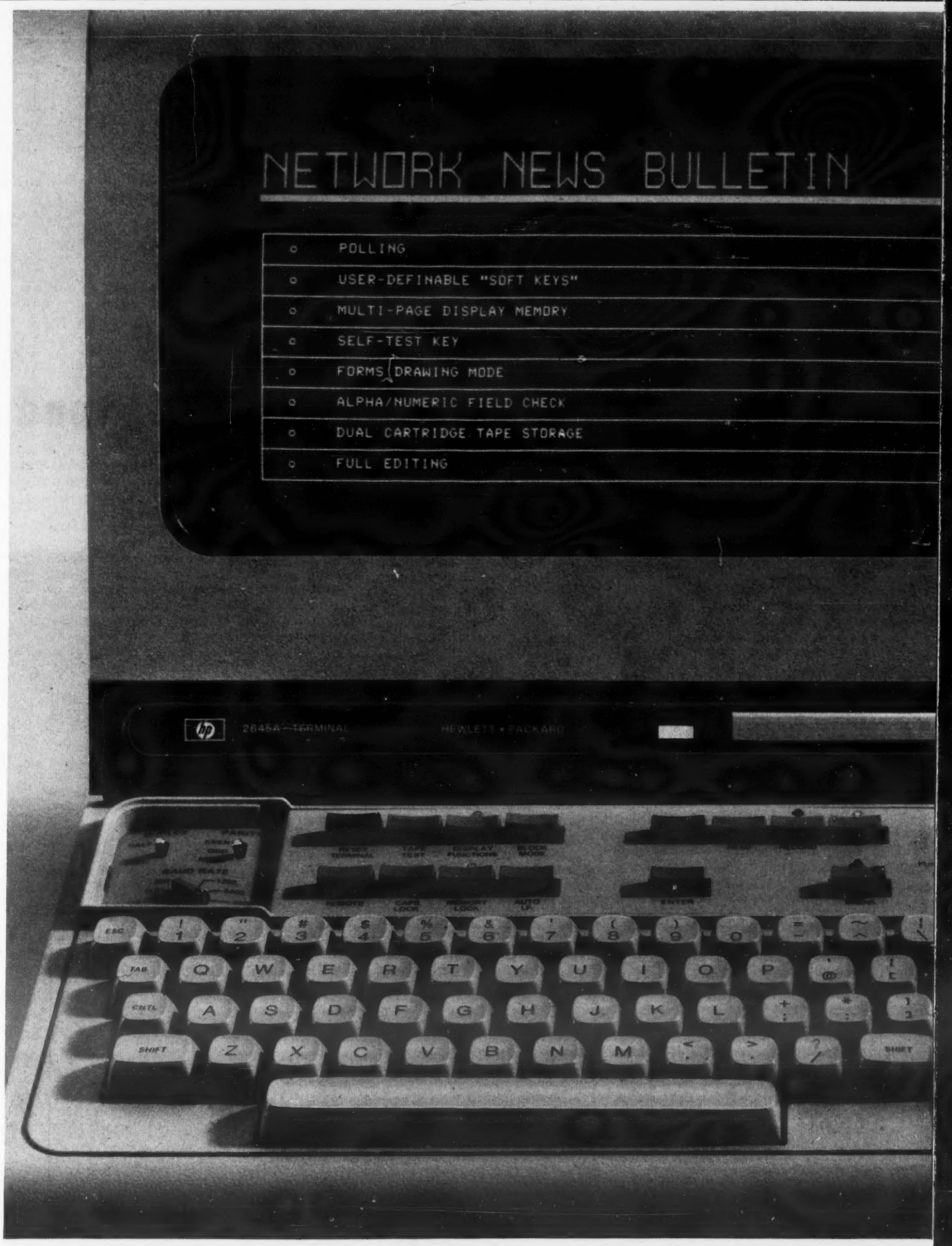

Julian Date Debate Continues

Would You Believe...

Regarding Schechter's date conversion method [CW, Nov. 8], would you believe:

```
DN =integer ((YYYY * 365.25) - .25
   - integer ((YYYY - 1) / 100)
   +integer ((YYYY -1)/400)
   +DDD
   +K
```

Donald J. Ramig [CW, Nov. 22] forgot the Gregorian Leap Year rule provides for dropping a day from every year ending in 00 whose number cannot be evenly divided by 400. (Both Peter F. Klammer and Edward C. Imperatore noted this). Thus, years 100, 200, 300, 500, 600, 700, 900, 1000, 1100, 1300, 1400, 1500, 1700, 1800, 1900, etc. were not leap years. Hence, there are not 3,652,500 days in the 10,000-year period noted by Ramig.

There are 3,652,424 days in this period according to my formula, where k = 0. However, since Pope Gregory XIII decreed only 10 of these 12 years from 0000 to 1582 should be used in his correction of the calendar, k should be 2. With this change there are 3,652,426 days in the 10,000-year period.

By the way, does anyone have a method for figuring out what date Easter will fall on for the 10,000-year interval beginning with year 0000?

James Hammill

Pleasant Hill, Calif.

Confusion Corrected

Peter F. Klammer's article was absolutely correct and he was absolutely right in taking strong exception to David Schechter's description of the term "Julian" date.

The mystery which Klammer was concerned with may be explained by the fact the Julian date begins at 12 noon; consequently the design to calculate the Julian date in the absence of any time information generally gives the date as a string of digits followed by a decimal point and the number 5.

For once, the confusion between the year and day of year, the serial day of the year and the Julian date has been laid to rest, hopefully for the last time.

A.L Bender

Westwood, N.J.

And in Self-Defense...

Peter F. Klammer's article [CW, Nov. 22] erroneously charged me with misappropriating the term "Julian" date. According to the "Burroughs Cobol Reference Manual for the B2500 and B3500 Systems" (1033099):

"Date (Julian). This special register contains the current Julian date and is maintained by the MCP. Its format is YYDDD. For example, if the current date were Jan. 1, 1968, the DATE register would contain 68001. The function of DATE is to save programmatic evaluation of TODAYS-DATE when Julian dates are required. DATE is maintained in COMPUTATIONAL form."

Klammer's quarrel is with Burroughs or commercial DP usage rather than with me.

As to the other comments:

Larry Runtsch was correct in stating 1900 was not a leap year. That is why my formula: FDN = integer ((YY * 365.25) -.25) + DDD (as corrected by Edward C. Imperatore) contains the subtraction of .25.

Joseph W. Begasse was correct that IBM 370 binary arithmetic operations on 16-bit fields will yield negative numbers when the high-order bit becomes 1. It is my assumption that anyone using the data compaction technique I recommended would realize this and, accordingly, will rightly justify the 16-bit field in a fullword that has been previously loaded with binary zeros prior to making any computations.

Donald J. Ramig's observation that my technique is useful for only the next 23 years was well taken. But the limiting factor is really the fact that in commercial systems we normally capture only the last two digits of the year.

David Schechter

New York, N.Y.

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Take Printouts, for Example

Simple Solutions Often Cure Intercompany Bickering

By Paul B. Riser
Special to Computerworld

In big businesses that have their own DP centers, intercompany bickering arises because of a lack of communication or because of small problems from equipment malfunctions or breakdowns in the data center.

Since the lack of communication between departments is an administrative function, I will attempt to help resolve one problem that constantly confronted my own company's data center: off-line computer printouts.

When computer functions for a company are performed within the company rather than by a private service, the quality control of off-line computer printouts is not and sometimes can not be regulated.

And when another department receives its printouts in a less than legible or complete form, static between that department and the data center occurs.

Although incidents such as this cannot be avoided completely, they can be corrected in companies with multiple printers and/or tape drives with more speed.

The problem that confronted my company occurred because several departments were receiving printouts that had a few characters dropped on each page. This would not have been too serious if not for the fact that one of those characters was sometimes part of an important number or a letter that could change the meaning of a word or sentence.

Reader Commentary

What we did was change the printing program so the printer number, tape drive number and the date printed were included on the first page of the printout.

By using this method, the offending printer and tape drive could be pinpointed and checked out for problems; previously it had been necessary to check out all of the printers and tape drives.

This saves maintenance time and operation downtime. After all, the main purpose of computer operations is to save time and money.

Letters to the Editor

Too Much Flapdoodle About Date Storage

What is all the flapdoodle about better ways to store dates in files? *Computerworld* is publishing a lot of garbage on this subject, all of it by engineers of inefficiency who have not yet heard of that marvelous machine – the stored program computer. They seem to be concerned more with abstract ways of using data than with efficient ways of storing it.

As a programmer cum systems analyst, I prefer to store all information on a computer in two forms simultaneously: computer-usable and human-readable (I believe this is called external decimal by IBM).

Similarly, I prefer to store dates in the form JAN. 01 1977. When computations are necessary, these items are converted to their most usable format by that marvelous invention – the stored program.

Okay, so a few more CPU cycles are utilized to convert the data from the most useful form to the most usable form. Generally, for small systems, the total amount of extra CPU time over a year will be small in comparison with just one attempt by a human to make sense out of one of these efficient pieces of data.

My deadlines are more important to me and the company than a small additional load on the CPU.

James G. Gervais
S.A. North American
Life Insurance Co.
Toronto, Ont.

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Computerworld 12-6

Without Regulator, DP Professionalism Only a Myth

By Louis Fried
Special to Computerworld

Reader Commentary

For several years there have been many articles, discussions and meetings aimed at establishing data processing as a "professional" field. A great deal of effort has been expended by organizations, even to the development of a "professional code."

Some of these efforts have resulted in significant benefits to the field in general. However, all the exertion directed at acquiring professional status is wasted time and wishful thinking.

Drawing on the examples of doctors, lawyers and athletes, there appear to be four criteria necessary for a field to be recognized as a profession:

- Established standards of education and expertise for entry into the field.
- Standards of continuing performance in the field.
- Standards of ethics.
- A sanctioning body for control and licensing of practitioners in the field.

While there is no disputing the need for professionalism in DP, there is clearly a question as to the possibility of DP ever meeting all the criteria for professional status.

Although most computer people in the field today have acquired their skills through apprenticeship rather than formal education, this is a time-honored way of achieving professional status.

Standards of education, tests of expertise, standards of performance and standards of ethics can, and have been, established. But the concept of professionalism lies not only in qualifying for the field, but in control of the performance of the professionals.

A doctor, lawyer or even a professional athlete can be denied the right to practice if he fails to meet the standards of performance and ethics at any time *after* he has qualified.

The creation of standards assumes the freedom of choice on the part of the professional to say "no" to any action that violates the standard. In other words, the essence of professionalism lies in the independence of the professional.

Several factors may contribute to that independence. These include a diversity of clientele representing multiple sources of income, a shortage of the skills involved permitting ease of reemployment or uniform regulation and control providing appeal to an independent body.

But the "professional" whose entire livelihood is dependent upon one "client" (his employer) does not in fact have a freedom of choice. The "captive" professional has only the freedom to comply with the demands of his employer or quit.

Of course, there are individuals who will choose to act in accord with their ethical principles regardless of the consequences. And there are many individuals in the DP field who will act in a truly professional manner at all times and in all circumstances.

But the discussion of professionalism for the DP field centers around licensing and enforcement for all members of the field. The vast majority of members of existing professions may protect their independence either by contract or by their role as individual practitioners. This majority can therefore set standards the minority of captive professionals must observe.

In our present environment, the vast majority of DP people are protected neither by contract nor by independent status. Dependent for his livelihood on his employer and not able to quickly market his skills without some personal loss, the DPer has a greater incentive to ignore professional standards than to uphold them.

Until the individual in DP has a greater incentive to comply with the standards than to ignore them, or would suffer a greater penalty (such as disenfranchisement) upon conviction of a violation, there will be no true independence of choice and no true professional status for the field.

Considering the alternatives, the most expeditious way to achieve the goal of professionalism is through the establishment of an independent federal regulatory commission.

Without this or a similar control mechanism "professionalism" for DP will always be a myth.

"Sycor service keeps my network uptime to 98.5%."

Bill Dierkes, VP Information Systems, The Keebler Company.

The Keebler Company, second largest producer of cookies and crackers in the U.S., has six bakeries and 63 distribution centers serving 90,000 retail outlets. Keebler's sales force of more than 1200 used to mail 40,000 orders per week to the 63 distribution sites, where processing and invoicing were done manually. The problem was, these orders weren't getting processed fast enough.

The installation of Sycor intelligent terminals changed all that. And established a new set of order processing standards. Operating at peak efficiency, invoices are now transmitted from the CPU back to the branch locations the same day orders are received. Keeping up this level of performance demands terminal and service reliability.

Keebler puts Sycor to the test.

After a year of operation, Information Systems VP Bill Dierkes wanted to know how reliable Sycor terminals and service were.

"I conducted a survey of 61 of our Sycor terminals from December, 1975 through May, 1976. Some of the terminals were in out-of-the-way places like Minot and Fargo, North Dakota; Billings, Montana; and Pocatello, Idaho. Places where service might be a problem.

"What I found out really amazed me. Naturally I expected the terminals to be reliable, and I expected Sycor to back them up with good service. But even I was surprised to find that, when a station went down, *80%* of the time it was back up again in four hours or less. And *95%* of the time in eight hours or less.

"When you consider that each location uses the terminal an average of eight hours per day and that there are 127 working days in the six-month period surveyed, the total system was up 98.5% of the time."

A Sycor intelligent terminal is a management tool.

Beyond fast maintenance and reliability, Bill Dierkes has found many other benefits from his network of Sycor intelligent terminals.

"Price, ease of installation and the Sycor terminal's ease of operation were other factors I considered. But the real benefits emerged when the system was installed. As soon as it was up and running we were able to reduce order processing labor by 75%, inventory by 15%, and process 40,000 accurate invoices per week. My Sycor system is a real management tool.

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Documentation's Value Enhanced If Writer Covers Three Bases

By Richard Zaneski
Special to Computerworld

System documentation requires accurate technical data, detailed organization and a basic design philosophy. If one or all of these points are not covered fully, the written product will be ineffective.

To prepare well-structured system documentation, formalized standards must be established. In a standardized framework, all areas of information are clearly defined.

An efficient method of formalizing system documentation is dividing the information into three general areas – design history, design data and related work procedures.

The design history traces the life cycle of the system, outlines future considerations and illustrates any detailed control features. If all areas are covered fully and written in depth, a system design philosophy will become apparent.

To ensure this fact, documentarians should develop the following key points.

• *Chronologic System Diary.* Outline all details in a system's development from inception to implementation. Highlight all mistakes and any corrective procedures taken. Also, detail the successful progress of the system on a daily basis.

• *System Controls and Audit Trails.* Describe the steps necessary to control system functions in a daily work environment.

• *System Constraints and Assumptions.* List all constraints and assumptions that influenced the design approach.

• *Planned Innovations.* Describe all developments that will be used in the future.

Once an in-depth picture of the system's design is shown, document all technical data in detail. The following points should cover all pertinent areas:

• *System Overview.* Write a narrative description of the system and supplement it with a flowchart. If there are subsystems, show how they interface with the overall system.

• *File Identification.* This section should contain the descriptive material on all files, showing their data fields; the location of files on disk packs using an illustration; overflow extents; volume capacities; and retention records of each file.

• *Input and Control Card Descriptions.* Show all card layouts in a tabular format. Indicate the conditions under which they are submitted and to which program.

• *Input, Form Descriptions.* Show actual copies of the forms if available. Describe each and how to complete it.

• *Program Descriptions.* Include data on program function, input and output files, work and reference files, output reports, run frequency, program logic and related program flowchart, input and control cards, console messages and required actions, most current job control language and interrelationships with other programs and systems.

• *Utility Module Descriptions.* Cover the same categories of information as shown in the program descriptions.

• *Report Descriptions.* Provide current report layouts and actual copies of the reports, if available. Include data on report function; field definitions; sequence of information; totals; frequency of use; distribution, retention and disposition; number of copies to be printed; products each program; and special conditions.

• *Code Listings.* In a tabular format, list all codes used on forms and reports.

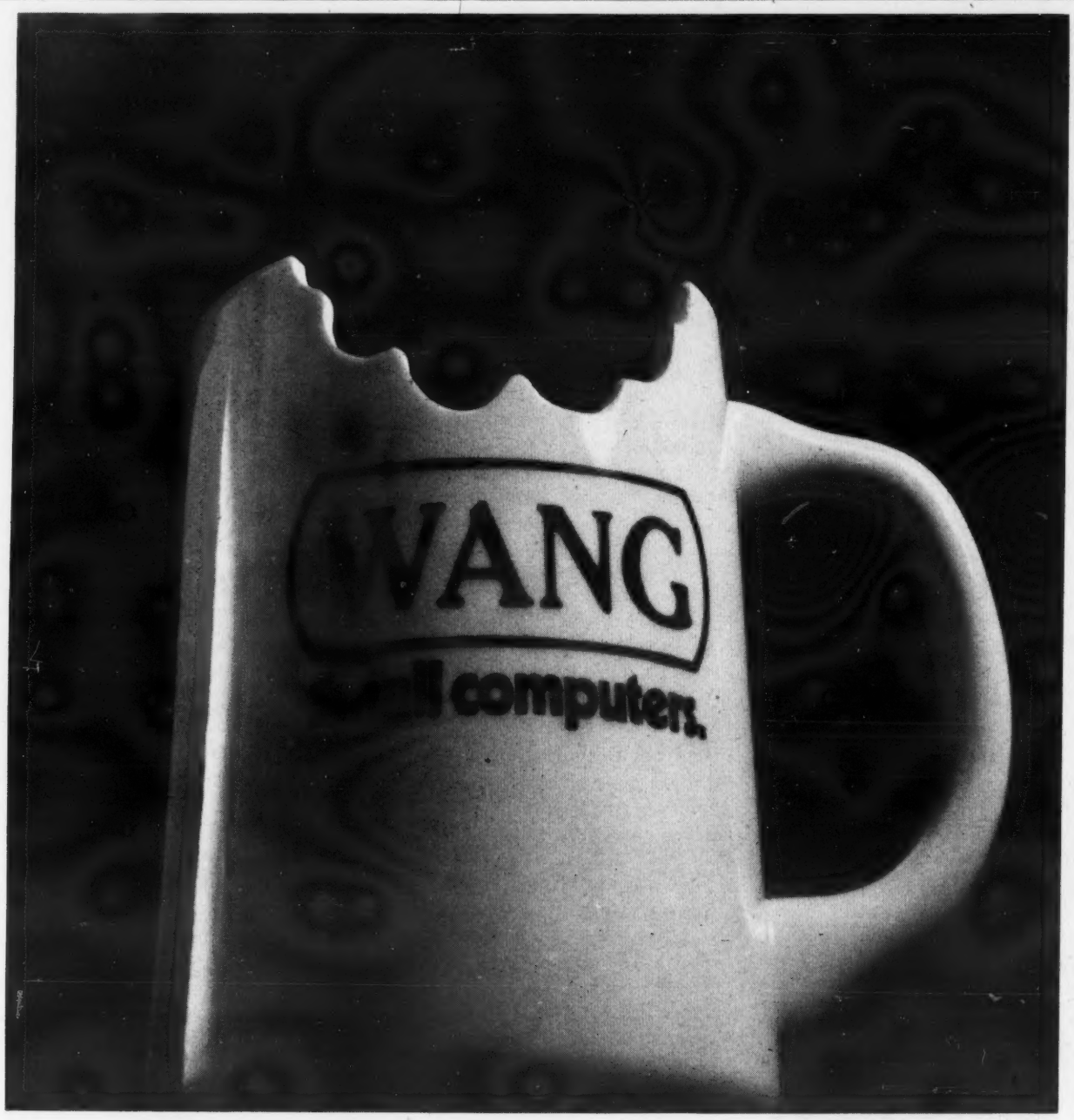
After the technical areas of information are documented, the system can be related to the human element. This documentation phase should show every job function used in a daily work environment.

Divide the functions into the categories of clerical, control, scheduling, operations, bursting and decollating, security and miscellaneous.

As a general rule, be flexible and receptive to change in preparing the three sections of system documentation. Gear the finished product to the systems and programming staff and related DP departments.

If well-organized system documentation is produced that generates a design philosophy and details all technical data, other areas of documentation can be developed.

Reader Commentary



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Small computers. CW 12/76

Convict Shouldn't Be Deprived of a DP Education

By Kenniston W. Lord Jr.
Special to Computerworld

Amidst the brouhaha of gun control legislation referenda, a new Internal Revenue Service (IRS) bill which makes extensive use of the Social Security number and the long, drawn-out affair of U.S. vs. IBM, now we hear an inmate at Leavenworth might have used a computer to defraud the IRS of tax revenues.

And while little has been written about it other than the reporting of the incident, J. Daniel Couger has postulated a very interesting question [CW, Oct. 11]: Should a computer be placed into the hands of a known criminal?

He concluded we have done little to teach ethics as they relate to DP and, since we have done such a miserable job there, to place such a tool at the disposal of a convict population demonstrates a lack of wisdom on the part of some official somewhere.

Perhaps there is nobody more concerned about the safe use of a computer than I. But to make such a statement and to draw such a conclusion is, at once, both absurd and begs the basic issue.

Personal Experience

Like Couger, I was approached by an inmate of the Leavenworth program for some publications I produced some years ago.

Through a rather lengthy correspondence with this inmate, I found him to be well-educated, articulate, extremely bright and patently ambitious. If memory serves me, he was an ex-stock broker, had an IQ near 150, was a member of Mensa and had an extreme thirst for knowledge about DP.

Whether or not he was repentant I had no way of knowing, and I never did ask why he had found his way to the federal prison. I do recall he was looking forward to parole and to a DP job somewhere in Wisconsin.

Couger suggested these are the kind of people who ought to be kept from a computer, for since they have proved their lack of trustworthiness, it therefore follows that lack of trustworthiness can get translated into lack of trustworthiness by means of the use of a computer.

Speculation Remains

Perhaps. And then, perhaps not, for there is still speculation as to whether the inmate who, it is alleged, has defrauded the government was able to do so prior to access to the computer and without its assistance.

Couger suggested since there is a possibility the leopard may not change his spots anyway, there is little use in providing a data accelerator for him to perform his dastardly deeds.

It's unfortunate Couger's article did not deal with the recidivism rate of inmates who have completed that particular program of rehabilitation. I think we could draw all kinds of generalities about the people who have free and open access to computers and how they may perform such deeds undetected. As was pointed out in a recent article, the most successful computer frauds have not yet been discovered.

There is no doubt there is some form of recidivism among ex-convicts, even those from Leavenworth. No, I would not be one to hand a gun to an inmate who had been convicted of armed robbery. But, at the same time, it must be remembered DP is a learned intellectual endeavor.

Someone intent on using that intellectual endeavor in an unlawful or dangerous manner will most probably use it that way. My correspondent was extremely bright – a genius. There is no way to keep him from learning about DP if it interests him.

So, too, it would seem, is the situation which fits the inmate charged with breaking into the IRS files. If the individual involved was smart enough to find a way to do what he is accused of doing, then, so motivated, there will be nothing which can stop him.

So there now remains the basic question and the one which Couger really avoided: Should not a system which someone wishes not to be penetrated be designed to be impenetrable? Should not a system which contains sensitive data not be accessible to someone with no reason to have access to that data? Of course.

The simple fact is this: Those systems which we have classified as "secure" are, in many cases, anything but secure. We go to great lengths to assign passwords which are easily broken.

In my security inspections, I still find passwords consisting of the people's initials, dates of birth, Social Security numbers and the like. I find, as I look through organizational practices, a total disregard of the value of the data contained on many files.

In short, until we, as practitioners of the art (or science, if you will) take the situation seriously, anyone with the interest or the skill can gain access to the data.

Jerry Schneider proved that; by his own admission, he didn't have to be a technical wizard to do so.

. . . And in This Corner

To suggest an inmate graduate of a successful rehabilitation program will be prone to go out and crack such a system merely because of his personal history really begs the question of why the systems were developed so loosely in the first place.

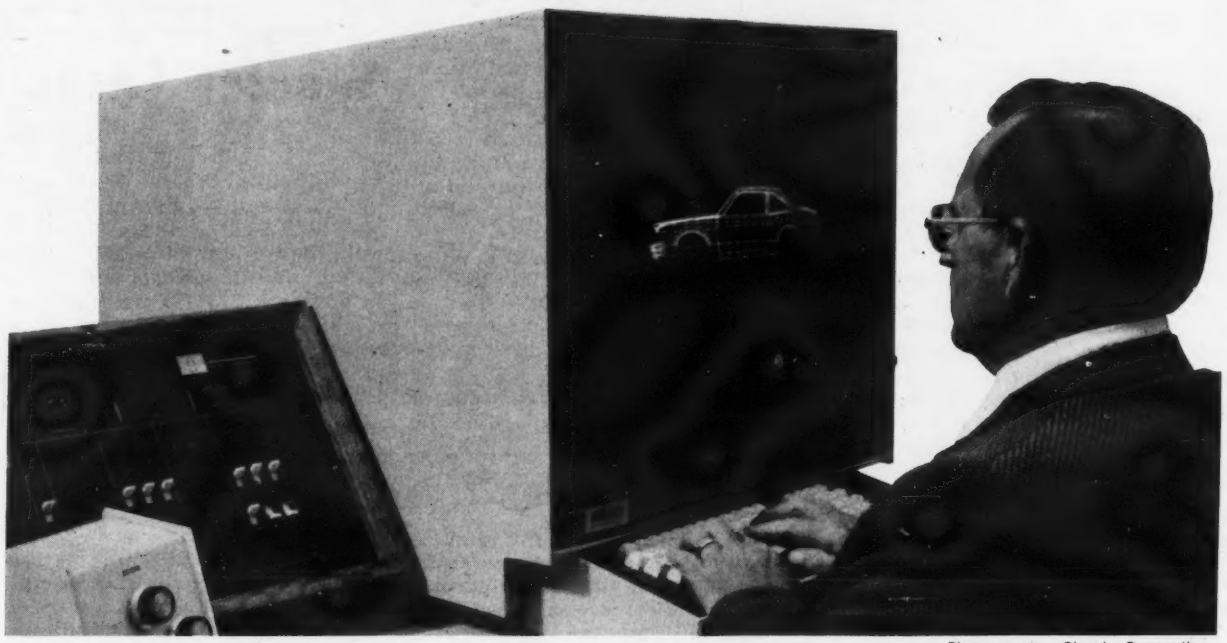
Couger was correct, however, in this case by demonstrating the need for inclusion of ethics modules in a training curriculum. He recognized that such is part of the fabric of a profession.

However, he, like you, should recognize adherence to ethics is but part of the fabric of a profession and that the other parts, including personal accountability under law, are a must before the situation is to be corrected.

In the meantime, and while we wait for the industry to come to that conclusion, the safest way to make a system safe is to make a conscious attempt to penetrate it under controlled circumstances and then to plug those holes.

But let us not denigrate a program which is working successfully for the actions of an individual who would misuse it. If the system can be penetrated by one of those individuals, it can be penetrated by anyone.

Totally Refreshing...



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Avoids Potential Conflicts

Free Code Said to Manage IBM Control Block Usage

By Don Leavitt
Of the CW Staff

GARDEN GROVE, Calif. – Possible conflicts between competing uses of IBM OS and OS/VS control blocks may be averted by a chaining technique developed by and being offered free by Jerry G. Slater, president of Tone Software Co. here.

For some time, Slater explained, "ingenious" systems programmers have used fields within the control blocks for their own data storage. Use of a field by one program, however, generally precluded use of the same field by another since no method had been developed to save/restore values found in the fields when they were needed by a program, he added.

Conflicts were avoided because the whole installation knew which control block fields were used. And that worked fine until the recent surge of interest in proprietary packages that often use control block fields for their own purposes without documenting such use, Slater said.

Among the control fields which are in demand are the CVTUSER, TCBUSER, TCBTRN and TCBTSFLG, according to Slater, who added, "IBM does not guarantee the future availability of any fields except CVTUSER and TCBUSER."

To help himself – and now the wider DP community – Slater has written three macros and a Type 2, 3 or 4 Supervisor Call (SVC) instruction for the purpose of chaining control blocks from the two fields IBM will guarantee to the user.

Slater is prepared to distribute the code in a hard-copy listing free to anyone who wants it enough to send him a self-addressed, stamped "business-sized" envelope.

He has "neither the time nor the inclination" to serve as a clearinghouse in the event errors (and solutions) are found, Slater said.

The SVC was designed in such a way that the SVC number can be any one that is available to an installation, and neither the systems programmer or the software provider needs to know the number, Slater claimed.

The code "seeks out the SVC number the installation has defined and uses that," he explained.

There are numerous ways in which the coding may be used, Slater said, adding as an example that – until now – it has often been "difficult to pass parameters between programs and subtasks or programs and asynchronous exits."

Since adding, retrieving, changing and propagating of the control block fields will now be possible, "many hardships should be alleviated," Slater claimed.

Tone Software has tried to maintain a good working relationship with all software vendors and "we hope this code will be of value to all who utilize IBM's control blocks in their own products," Slater said.

The free distribution "certainly means vendors are welcome to the code since it will obviously be in the public domain," he added.

The modification will be in the next release of the Tone III package and will be available at all Tone customer locations during the first quarter of 1977.

But, Slater emphasized, "this in no way implies the code for this modification is applicable only to VS1 or to Tone customers."

Tone is at 11588 Trask Ave., Garden Grove, Calif. 92643.

DEC Tells Features, Not Price Of Software for Large Systems

MARLBORO, Mass. – Along with the addition of hardware in its Decsystem-10 and Decsystem-20 line [CW, Nov. 29], Digital Equipment Corp. announced a range of software enhancements for all models of both series.

Updated Fortran and Cobol compilers, an extended APL, a conversational PL/I subset, an enhanced data base management system (DBMS) and an interactive query language were the major products. A sort/merge with a true merge capability is also available, DEC said.

The enhanced Fortran IV is said to have "greatly improved" error-handling facilities at runtime. These include error exits on OPEN and checking for both data and hardware errors, a spokesman noted.

Subscript optimization has been improved substantially, providing "a major increase in performance," he claimed.

The latest Cobol includes all the standard features of the earlier versions, but also supports American National Standards Institute (Ansi) tape label conventions, the company said.

The merge capability of the sort/merge package will also be available to users of this compiler, the spokesman added.

APL-SF was described by DEC as a "highly extended APL" which supports standard system features and variables and a facility to create local features and variables. The package also backs "extensive" I/O facilities and the ability to set workspace parameters up to a maximum of 512K bytes.

DEC's Conversational Programming Language (CPL) is a high-level interpreter subset of PL/I, DEC said. It supports all four PL/I storage classes, the majority of PL/I built-in functions and pseudo variables, according to the spokesman.

Fixed, float, character, character varying, bit, bit varying and pointer data types, recursive procedures and both stream and record I/O functions are also supported, he noted.

The updated DBMS includes backing for simultaneous updates of the same field by several users as well as all the features in the previous system. A "sorted sets" feature has been introduced to permit efficient organization of data; a data base format increases performance while retaining and improving high reliability, according to DEC.

DEC's Interactive Query Language (IQL) handles retrieval and report-writing chores, working with one or more data bases or conventional sequential files in response to user-initiated requests, the spokesman said.

IQL features are said to include record selection, condition processing, computational operations, total and subtotal accumulations and formatting capabilities for multiple reports.

The spokesman claimed most if not all the software is available now and has been in field test, but he refused to provide pricing information for any of the products, saying it would be against corporate policy to do so.

DEC's large-scale systems headquarters is on Forrest St., Marlboro, Mass. 01752.

Monitor Tracks TSO Usage

ARLINGTON, Va. – TSO/MON, a software package from Morino Associates, quantifies various performance aspects of Time Sharing Option (TSO) usage on large-scale IBM 360/370s, according to a vendor spokesman.

TSO/MON collects performance and utilization information at the system and user level and writes the information on either a System Management Facilities (SMF) or user-defined data set, he said.

The Morino monitor operates continuously and summarizes the data collected on a user-defined recording interval, he added.

In its output, TSO/MON provides information to quantify TSO performance, measure the results of tuning changes, identify TSO problem areas and analyze user problems.

It provides management with data on TSO response time, system load, user access and system availability.

The package requires no modification to the operating system or to TSO, costs $8,900 and is available from Morino Associates, Suite 101, 1401 Wilson Blvd., Arlington, Va. 22209.

Spooler Eases IBM 3/8 Printing

SANTA ANA, Calif. – Spool/8, a printer spooling package for IBM 3/8 users, may increase throughput by as much as 25%, according to its vendor, Business Systems Technology, Inc. (BST).

Described as the first spooler available for the 3/8, the software was developed by BST on a 3/10 – in that environment, it is called Spool/10 [CW, Mar. 1] – and requires use of the 3/10 control software from IBM as well as a BST printer on the 3/8.

(As a by-product of installing the 3/10 control software, BST found 3/8 users also gain support for various disk systems not available to them with the software IBM usually provides for the 3/8.)

Spool/8 enhances system operations by transferring output for the printer to intermediate disk storage; the output can be moved to the printer as that relatively slow device becomes available, a spokesman explained.

Meanwhile, the application program generating the print lines is free to continue at its own speed without having to wait for the printer, he said.

Spool/8 begins print operations before a complete file has been created on disk, making it faster than more conventional "print file" generation and off-line printing, BST said.

Beyond that, Spool/8 allows the user to stop the operation at will, to change the printing sequence of stored output or to produce repeated copies of whatever reports are wanted, the spokesman added.

Althqugh Spool/8 requires BST/750, BST/550 or BST/400 printers and at least 7K of available memory, either BST, IBM or compatible disk drives may be used.

Spool/8 costs $25/mo in sites with BST drives and $75/mo in sites with drives from other sources, the company said from 3015 Daimler St., Santa Ana, Calif. 92705.

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'TSAS' From ISC

Accounting Package Bills RSTS/E Users

WALTHAM, Mass. – Managers running Digital Equipment Corp. PDP-11s under RSTS/E can bill time-sharing users for system resources – and document both "raw" use and dollar values – with the Timesharing Accounting System (TSAS) from Intelligent Systems Corp. (ISC).

The package can be used in commercial service bureaus or in-house installations which provide service to "customers" within their own organizations.

In the first situation, billings are for actual money owed; in the second, the "billings" might only result in internal transfers, ISC said.

While usage is accumulated continuously, customer invoices or statements can be generated upon demand or on a regular basis, normally at month-end, a spokesman added.

In addition to allocating operating costs to internal time-sharing users and providing overhead information to the data center itself, TSAS can also be used to ensure that computer resources are equitably distributed among departments, he said.

Accounts may be classified as billable, development, trial or free; end-of-month reports summarize usage in total and by classification. Beyond that, special rates may be assigned to individual accounts, ISC said.

These might be used in situations in which one-time levels must be exceeded before any billing takes place in order to give new users time to get acquainted with the system or when surcharges must be applied when scarce resources are "overused," the spokesman suggested.

In use at ISC's own installation for more than two years, TSAS is available in source code for $3,500, while binary copies cost $2,500.

ISC is at 460 Totten Pond Road, Waltham, Mass. 02154.

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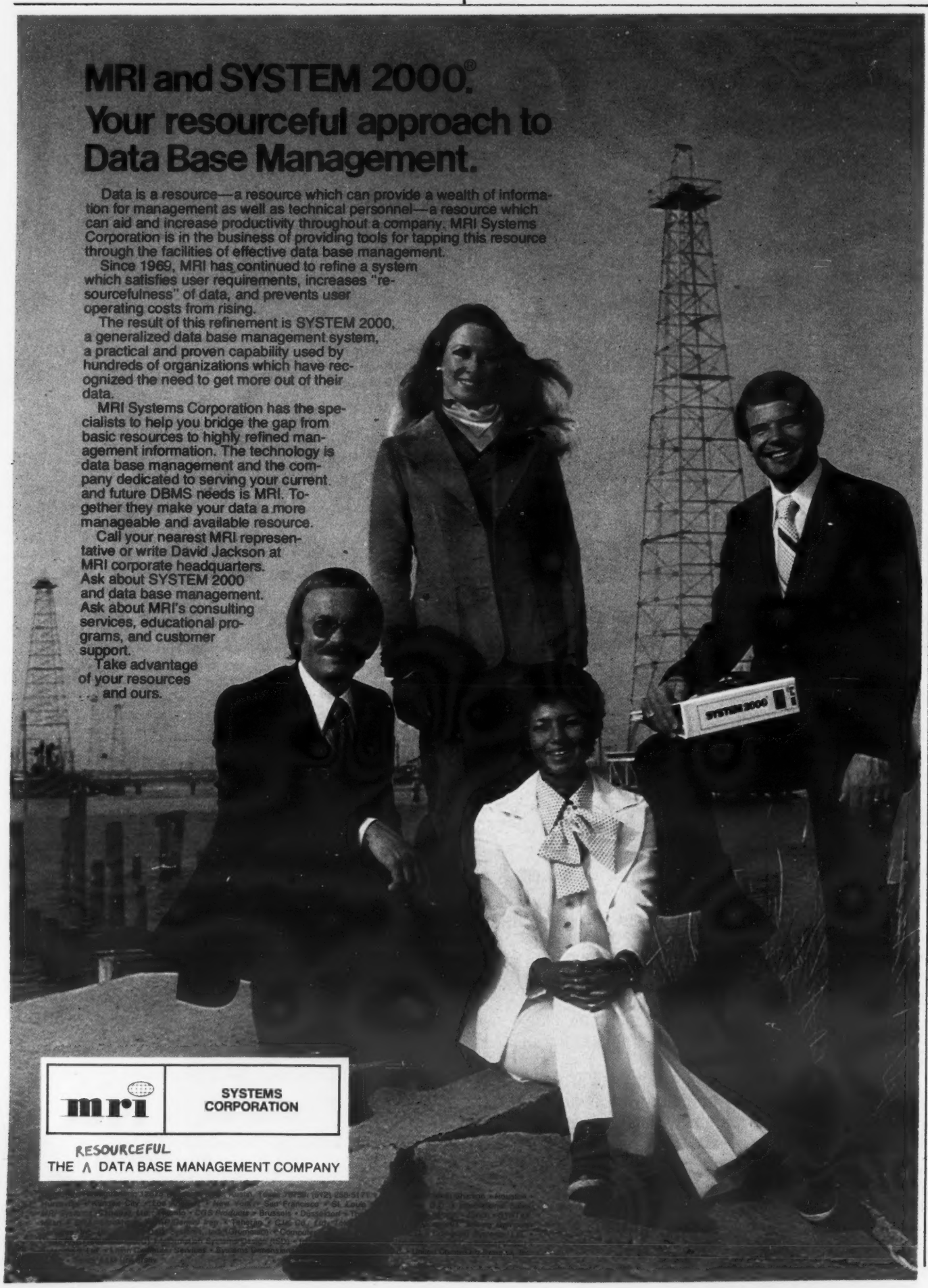

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HIS Minis Gain Basic, Cobol

WALTHAM, Mass. – Honeywell Information Systems (HIS) has a Cobol compiler and Basic interpreter for its Series 60 Level 6 minicomputer family.

The Level 6 Cobol compiler is a subset of ANS Cobol-74 and is upward-compatible with HIS' Series 60 Level 66 Cobol, the company claimed.

This compatibility provides a significant tool for applications development for future distributed systems, a spokesman added.

The Cobol compiler also offers file-handling capabilities including OPEN, CLOSE, READ, WRITE, REWRITE and DELETE commands; table handling, subscripting or indexing to three levels; support of a SET statement; and full editing facilities, he said.

Cobol is available for a one-time license fee of $2,750.

The Basic interpreter operates in an interactive conversational environment in which a user can compose, edit, debug and execute programs as well as in a nonconversational "production" mode for program execution.

The one-time license fee to use Basic is $500.

Available now, both Cobol and Basic for Level 6 require 16K words of memory, a disk or dual diskette and teleprinter-compatible console device, HIS said from 200 Smith St., Waltham, Mass. 02154.

Rapidata Cuts Cost Of Storage on Service

FAIRFIELD, N.J. – Rapidata, Inc. has announced a 50% reduction in the cost of storage devoted to data base management systems (DBMS) on its remote computing network.

At the same time, the company is offering a reduction of up to 50% in the cost of all other on-line storage.

Rapidata is headquartered at 20 New Dutch Lane, Fairfield, N.J. 07006.

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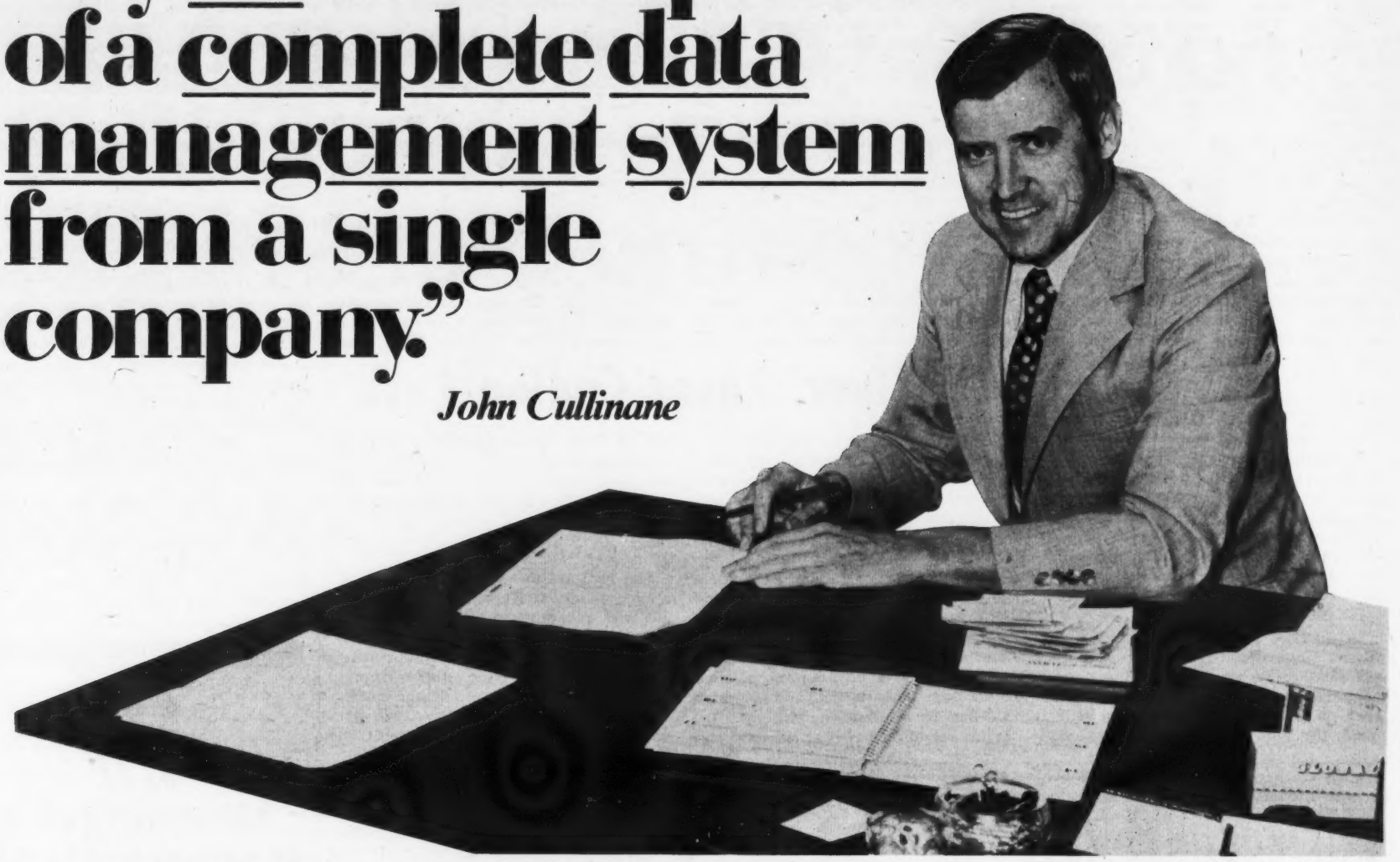
John Cullinane



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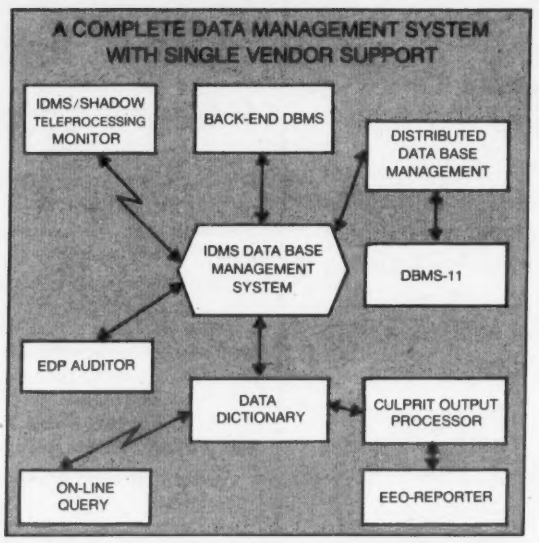

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Now operational on the DEC PDP-11/70, DBMS-11 is a complete implementation of IDMS, not a subset. Digital Equipment Corporation now markets DBMS-11 as their standard for the PDP-11 series worldwide.

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'Clever Words, Bad Advice'

Glibness Called No Way to Help Novice Tech Writer

By Julia Van Duyn
Special to Computerworld

The greatest disservice an accepted "authority" can do in any field, especially in DP, is to give misleading or false information. Young people entering the DP systems documentation profession – such as the one who wrote to Joe Rigo for "good guidelines on how to document a system" – deserve to get accurate guidelines.

Rigo's response [CW, Sept. 20] might have seemed plausible at first, but it was in fact filled with clever phrases – and bad advice.

For example, he urged the novice to "find out why [user departments] hate the systems staff." During eight years in DP – first as a programmer/technical writer, then as a systems documentation specialist – I have never encountered a user department that hated the systems staff.

It's true that some user departments may be suspicious of the systems development staff at first. Once they realize systems people are trying to make work flow smoother, however, most user departments become cooperative and establish a cordial relationship with the systems staff.

Keep on repeating the above, Mr. Rigo, and you may succeed in ensuring a conflict between user departments and systems people.

No Self-Assignments

Rigo's next step to instant knowledge and $30,000 per year as a systems documentarian was: "Join the team full-time when it is starting to develop requirements for a new system." Rigo should know that in almost any company a young, inexperienced technical writer cannot join a system team when he wants to.

Perhaps in science fiction he could get away with it. However, in the real world, it is the project leader who gives out assignments when undertaking the development of a new or modified system. It is the project leader's responsibility to decide at what stage of the project the DP technical writer/systems documentarian joins the team.

I admit that ideally the documentation person should become one of the team when the system requirements are developed. But what is ideal and what happens in the budget-restricted business world are two different things.

If any inexperienced person is foolish enough to follow Rigo's advice, he will very likely find himself in hot water.

On to Rigo's next goodie: he just couldn't resist using part of his space to "plug" his Special Interest Committee for Systems Documentation (Sicdoc). How can Rigo claim that joining Sicdoc is one of the keys to bring the beginning documentation person instant success and $30,000/year?

The Human Connection

Next in his "six easy steps" Rigo mentioned only IBM's Hierarchy, Plus Input, Processing, Output (Hipo) documentation technique as one of the tools of the trade.

Why should anyone, especially a newcomer to the field, waste hours drawing cumbersome Hipo diagrams when there are many other planning tools – such as Softech's Structured Analysis and Design Technique (SADT) [CW, Oct. 11] – that are easier to draw and maintain?

And finally the piece de resistance: "After you have gone through all these steps, you are ready to tackle your company's documentation problems. You have also become an experienced systems documentarian, and you are ready to move on to a company that pays better. IBM and Digital Equipment will go up to $30,000 for a good writer these days."

Hogwash!

That is the most outrageous misinformation I have seen in print, including the recent election campaign lies. Rigo knows damn well that (with one or two exceptions) systems documentation persons, even real heavies, earn between $14,000 and $20,000 a year – and not $30,000.

The sad part of fiction such as Rigo's is that young people entering the DP documentation field at anywhere from $9,600 to $10,000 may believe it and become dissatisfied, frustrated and even bitter. Of course, during these high unemployment times there are always people waiting for somebody to quit or be fired.

Perhaps Rigo thought he was being humorous. Instead, the resulting article was shockingly flippant and misleading.

Van Duyn is author of the Practical Systems and Procedures Manual *and a lecturer on documentation methods.*

NCI 'Tiger' Eases Coding Task

ATLANTA – The Total Interface Generator (Tiger) package from NCI, Inc., simplifies much of the coding that goes between a user's application program and data bases supported by Cincom Systems, Inc.'s Total data base management system, NCI said.

Tiger is said to generate detailed documentation for each interface function and to offer a way to standardize and control access to the data base.

In effect, the NCI package allows the Total user to include notation of what may be done with the data and by whom in the data base definition, NCI said.

Having established that at the data base end of the interface, Tiger frees the application programmer from coding all the details of what is needed and in what way in his CALLs to the data base, NCI added.

Tailor Tiger

The package also provides "unlimited" user exits at "strategic locations," allowing the programmer to tailor Tiger to meet specific needs, a spokesman noted.

Using these exit points, such operations as data editing, logging, time stamping, statistical accumulations, sign-on protection and the use of the dynamic data dictionary are easy to implement, he claimed.

Written in BAL, Tiger is available for use with Total versions 4 through 7 on IBM 360/370 mainframes operating under DOS, OS or VS. The package costs $3,450, NCI said from 6075 Roswell Road N.E., Atlanta, Ga. 30328.

'ASM-2' Price Break Offered Educators

CUPERTINO, Calif. – Cambridge Systems Group (CSG) is offering educational institutions in the U.S. and Canada a 35% discount on the normal price of its ASM-2 disk management package.

The price break is available only until Jan. 20, the vendor noted.

Designed for use in IBM OS and OS/VS environments, ASM-2 transfers disk files to tape once the files have met specified criteria. The space is then immediately made available for use by the remaining disk files, a spokesman explained.

While used primarily for "archiving" files not active enough to justify being on disk, the package has been used in several installations as a data migration tool, smoothing the transfer of files from IBM 2314 disks, for example, to 3330s, CSG said.

Under the discount plan, ASM-2 is available to educational institutions for $7,500, the vendor noted from 19857 Beekman Place, Cupertino, Calif. 95014.

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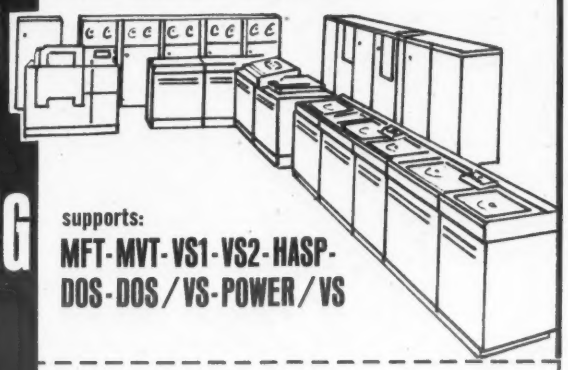

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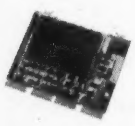

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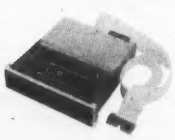

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Fraud Prevention Must Be Part of Training Courses

Before I'm besieged with letters about my last column [CW, Oct. 11] I want to print three paragraphs that were omitted. Without those paragraphs, the column invoked reader criticism that was quite valid.

J. Daniel Couger
On
Education

In that column, I referred to the newspaper report (denied by prison officials) which stated prisoners at Leavenworth were involved in a computer fraud. Leavenworth has a rehabilitation program that prepares professional computer programmers.

The paragraph in my column which, without further explanation, caused some justifiable reader concern was:

"Is it a mistake to train convicts to be computer programmers? Is it not tantamount to putting a loaded gun in the hand of a proven lawbreaker? Shouldn't prisoners be trained for less fraud-vulnerable professions – like beekeeping or winemaking?"

My intent was not to berate prison programs, as proven by the following omitted paragraphs:

"On the other hand, which professions are fraudproof? I don't know about beekeeping, but winemaking has its swindles. Most readers will remember the scandal last year when French winemakers were caught watering down their products.

"Nothing in the reports on the French scandal indicated ex-cons were behind the plot. Nor has the fraudulent use of computers in the U.S. corporations been the work of former prisoners – at least, in the publicized cases.

"No – the prison rehabilitation programs would be the paper tiger for a problem which is the fault of computer professionals rather than professional criminals. Our systems are vulnerable – like the hotel signs that urge us not to leave valuables in our rooms to tempt employees."

In *Crime by Computer,* Donn B. Parker described a number of cases of computer crime. He also provided evidence to support my previous conclusion on lack of ex-con participation in computer fraud. For prisoners completing the DP rehabilitation program at Walpole (Mass.), the recidivism rate is only 6% compared with the general rate of 60%. The 6% rate reflects virtually no computer-related crime, according to Parker.

Two issues were identified in my last column. Discussed at that time was the issue of our profession's attitude of implicitly condoning "breaking and entering" of systems. Examples were cited.

This column concentrates on the second issue – the vulnerability of systems to fraud.

Stanford Research Institute (SRI), under the leadership of Parker, has produced some insightful material on fraud. In a recent conversation, Parker said he now has 430 reported cases of computer crime in his file. Computer analysis of those cases will be available by the end of the year.

SRI's Brian Ruder believes wiretapping into terminals is a significant threat. Perhaps you saw a reformed "wiretapper" recently interviewed on the Sunday night television show "60 Minutes." He demonstrated how he could penetrate a "foreign" system with a portable terminal.

By 1980, computer-related frauds are estimated to be 50,000 incidents per year, resulting in annual losses of over $50 million, according to a study by the Institute for the Future.

Widespread Detection

Last year, in an article in *Harvard Business Review,* Prof. Brandt Allen showed computer-related fraud is not confined to financial institutions. He gave examples of detected fraud in manufacturing companies, wholesalers, utilities, chemical processors, railroads, mail order houses, department stores, hospitals and government agencies.

A more complete reference is the *Users Guide to Computer Crime* (S.W. Leibholz and L.D. Wilson, Chilton Book Co., Radnor, Pa. 19087). Part I covers the problems, e.g., "How to Tap, Bug and Spoof a System"; Part II covers solutions.

Computer science programs and company training programs need to expand the curriculum to include the study of fraud-preventive measures – for hardware, software and data-handling procedures.

At present the literature is sparse in this area; most of what is available covers installation security rather than system security.

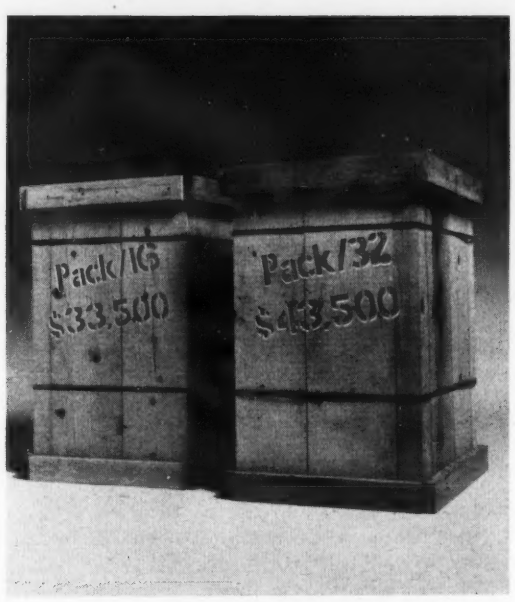
To begin acquiring the proper background, write to Parker for the six SRI reports on "Computer Abuse and Legal Issues Concerning Computer Abuse." SRI is at 333 Ravenswood Ave., Menlo Park, Calif. The price is $30.

The following additional references are suggested as an initial set of materials for the company or the college library:

- *Data Processing Digest*, 6820 LaTijera Blvd., Los Angeles, Calif. 90045. Each monthly issue contains a section entitled "Security and Privacy" and abstracts several recent publications on that subject area.
- *Guidelines for Computer Security*, published by the National Bureau of Standards, Fips PUB 41, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (70 cents). Order SD Catalog No. C13.52:41. Three categories of technical safeguards are covered: physical security procedures, information management practices and computer/network security controls.
- "Privacy and Security in Computer Systems," Rein Turn and W.H. Ware, The Rand Corp., *American Scientist*, March-April 1975, pp. 196-203. (The magazine has offices at 345 Whitney Ave., New Haven, Conn. 06511.) This article describes defensive design, e.g., concentration of software-implemented security functions into security kernels.
- *Privacy, Security and the Information Processing Industry,* Ombudsman Committee on Privacy, Los Angeles Chapter, Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036. The book covers vulnerability in computer systems, a security program and legal considerations of privacy.

Couger is professor of computer and management science at the University of Colorado.

ECONOMY PACK



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COMMUNICATIONS

Data Briefs

Micronet Lets Typewriters Send, Receive Messages

PORTLAND, Ore. – Sidereal Corp. has a microprocessor-based communications system designed to streamline corporate communications departments.

The Micronet II is a small box which attaches to a Sidereal or other typewriter and acts as an editing device; it also provides the capability to send and receive unattended messages, according to a spokesman.

The system has semiconductor memory capacities of 12K to 32K to allow editing and number dialing and redialing; it permits multiple addressing, automatic answerback and verification, among other functions, he said.

Micronet II attaches to Telex, TWX or dial-up lines, has built-in modem and RS-232 or current-loop interfaces and allows communications at all speeds between 50- and 1,200 bit/sec, according to the spokesman.

A Micronet II with 12K of user-programmable memory for formatting features costs $7,800, while the 32K version is priced at $9,300, he added from P.O. Box 1042, Portland, Ore. 97207.

Tektronix Initiates Modem Line

BEAVERTON, Ore. – Tektronix, Inc. has initiated a line of modems with the introduction of the Model 4931.

The 4931 is a stand-alone device, although Tektronix is offering it as an option to its 4010 terminal family. No special housing or outside power source is required with these terminals, a spokesman noted.

Three communications options are available with the 4931: 300 bit/sec for full-duplex systems; 1,200 bit/sec for half-duplex systems; and 1,200 bit/sec with a 5 bit/sec reverse channel for half-duplex systems, according to the firm.

All of the 4931 modems are said to be compatible with Bell System data sets used at the computer end of the communications line. The modems will operate on unconditioned telephone lines with a Bell Data Access Arrangement (DAA) or its equivalent, the spokesman added.

Prices for the modems range from $350 to $800. Tektronix can be reached at P.O. Box 500, Beaverton, Ore. 97077.

Allows Tailoring by User

Univac DCA Works With Variety of Nets

By Ronald A. Frank
Of the CW Staff

BLUE BELL, Pa. – As part of its recent hardware introductions, Univac unveiled a communications architecture designed to be compatible with a variety of network configurations.

With the Distributed Communications Architecture (DCA), Univac recognized the varying network protocols evolving before standards groups and planned user compatibility. Under DCA, a network will operate under Synchronous Data Link Control (SDLC), Advanced Data Communications Control Procedure (ADCCP) or Higher Level Data Link Control (HDLC), a Univac spokesman said.

Thus, the Univac designation of Universal Data Link Control means a user can tailor a DCA implementation according to the data link control being used in his network, a spokesman said.

The initial implementation of DCA includes a Distributed Communications Processor (DCP) which can operate as a front end to a Univac Series 1100 CPU, as a remote concentrator to Series 1100 or Series 90 CPUs or as a nodal processor.

Part of Telcon System

The DCP operates as part of a Telcon "intelligent communications system" that includes Telcon software which performs network control functions, line control and routing functions.

The Telcon network control software modules include internetwork control communications, accounting, error control, on-line diagnostics, status monitoring, command processing, system synchronization and related functions.

The DCP consists of processor, remote I/O controller (Rioc), diskette, cartridge disk, magnetic tape, Scanner I and II communication controllers and the remote control module.

Memory, which can be expanded in 16K byte increments up to 128K bytes, provides a word length of 16 bits plus parity, and direct memory accessing with a read time of 920 nsec and a write time of 860 nsec, according to the spokesman.

A 16-bit computer with 8-bit addressability, the processor includes storage interface, 32 general and 6 special registers, a read-only memory, an arithmetic section and function control sections. Internal data transfers are communicated by means of a single parallel bus which connects all logical units and the general register.

The diskette, an element of the DCP subsystem, operates with a special processor interface adapter to allow parallel I/O time-sharing with attached peripherals, the spokesman stated.

The Rioc provides 16 parallel I/O channels that may be operated in 8-bit or 16-bit mode; a 32-bit parallel operation is provided via strap selection. The Rioc interfaces an 1100 Series ISI I/O channel, peripheral subsystems or transfers information between Dual Communications Controllers, he said.

Scanner Functions

Line termination and multiplexing functions on the DCP are provided by the scanners. The Scanner I provides up to 32 ports either half duplex or full duplex while the Scanner II can handle up to 128 half-duplex or 64 full-duplex lines, the spokesman explained.

Two Scanner IIs can be attached to a DCP for a total termination capability of 256 half-duplex or 128 full-duplex lines, he added.

A small remote concentrator configuration of the DCP with 32K of storage and the capacity to handle 12 full-duplex lines costs $1,438/mo or $57,000, according to the spokesman. A dual V35 line adapter to handle bit-oriented protocols costs $38/mo or $1,500.

The first DCP systems are scheduled to be delivered in October 1977, he said.

DCA networks handle both Univac and

(Continued on Page 33)

Nine Parameters Recommended For Evaluation of Services

By Ronald A. Frank
Of the CW Staff

GAITHERSBURG, Md. – Users should consider nine performance parameters when evaluating telecommunications services, according to Dana S. Grubb of the Institute for Computer Sciences and Technology at the National Bureau of Standards (NBS).

Speaking at the recent NBS symposium on Computer Networks, Grubb said the parameters were primarily user-oriented and several were interrelated. If users objectively evaluate the parameters they can determine the service with the best overall performance characteristics, he said.

First, the transfer rate indicates the number of information bits transmitted divided by the time required for their transfer and acceptance. The significance of the transfer rate is that often the rate is reduced below the capacity of the line because of header, error-detection code and the time required for retransmission of frames or blocks with errors, according to Grubb.

The solution is not necessarily to increase the transmission rate of the line because this may also increase the amount of errors, he said.

The availability was defined as the time interval during which the telecommunications function is available to perform its assigned function.

Availability will vary according to the type of line. Dial-up users can have trunk busy conditions, private-line users can have circuit failures and packet nets are subject to the effectiveness of flow control procedures, he said.

Definition of Reliability

Reliability was defined as the ability to maintain the operation until the transmission of data has been successfully completed. Reliability is distinct from availability in that it describes the performance of a system after it has accepted traffic for delivery.

If traffic is not accepted, it has poor availability although it may have good reliability, Grubb said. Poor reliability can affect the cost of a service because a high failure rate implies high maintenance costs.

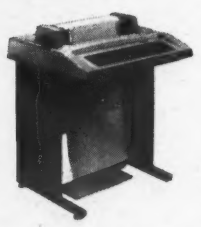
Next, Grubb listed accuracy or the correctness of the data accepted by the receiving terminal. Systems with accuracy problems tend to have reduced transfer rates due to the transmission of undetected errors which then require a retransmission of the information, he said.

Channel establishment time is a parameter limited to dial-up links and covers

(Continued on Page 33)

terminals

digital



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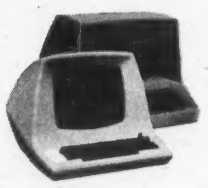

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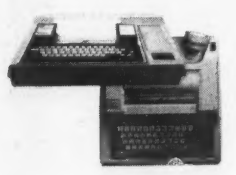

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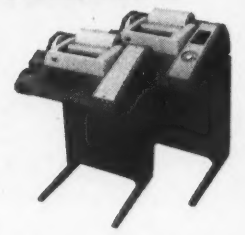

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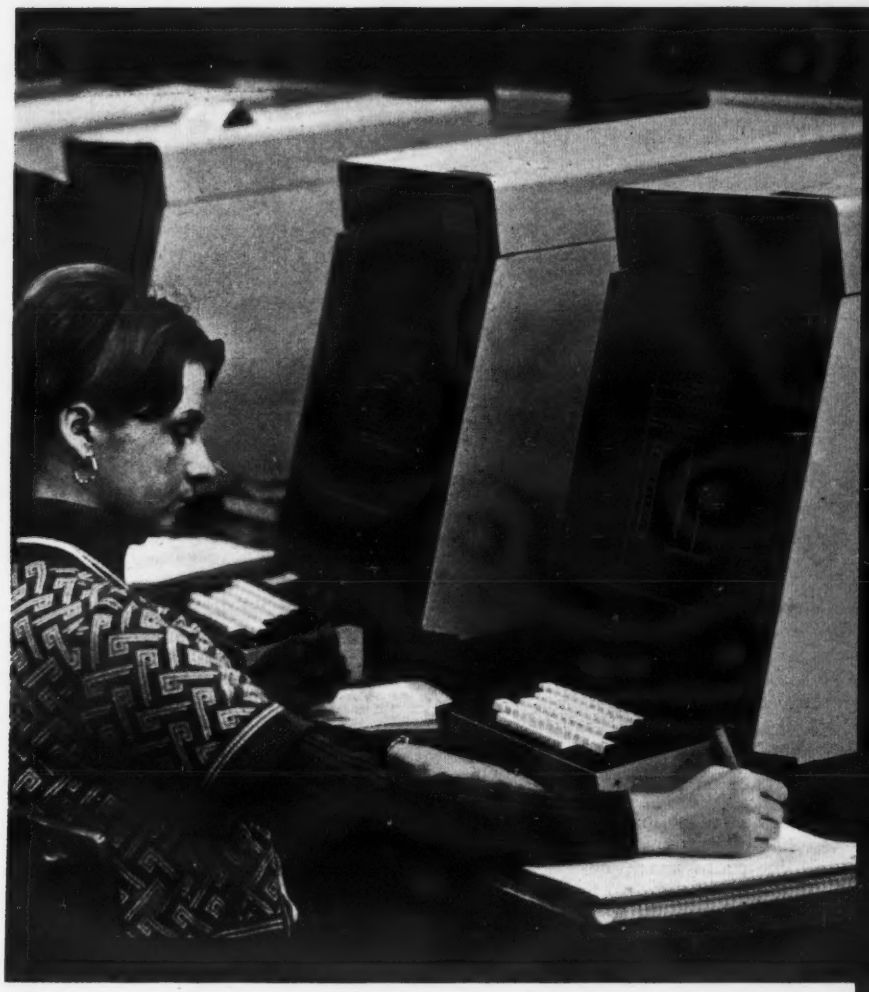
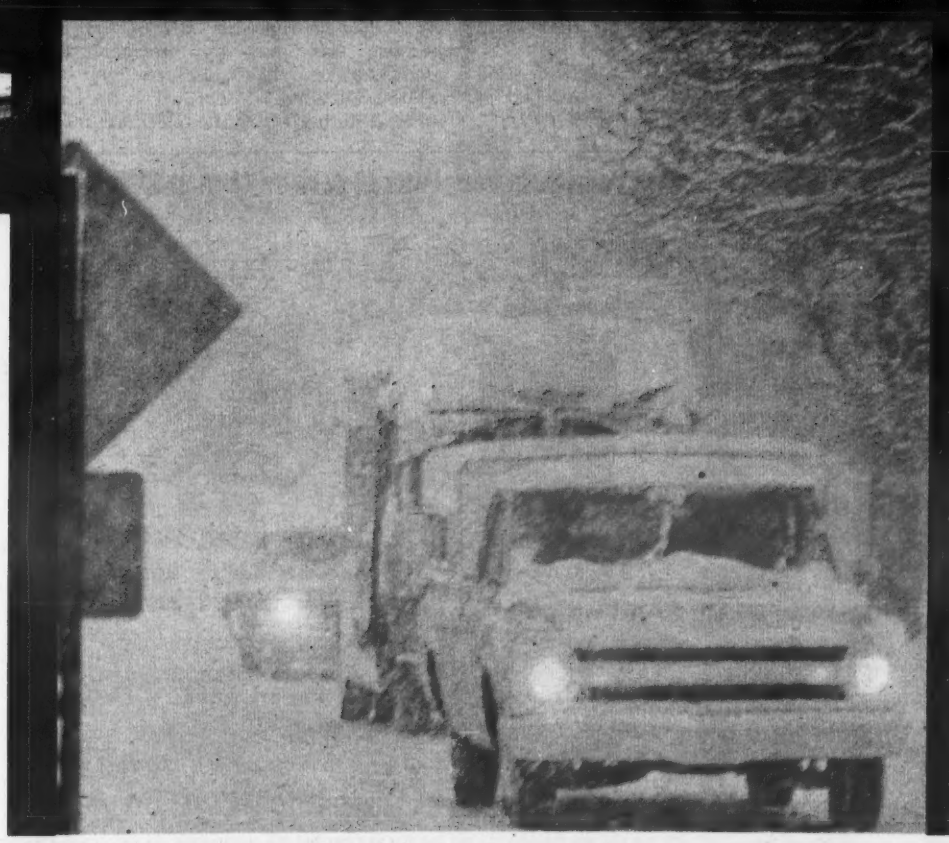


Interactive computer-based education systems use Control Data extended core storage to cut costly mainframe CPU time.



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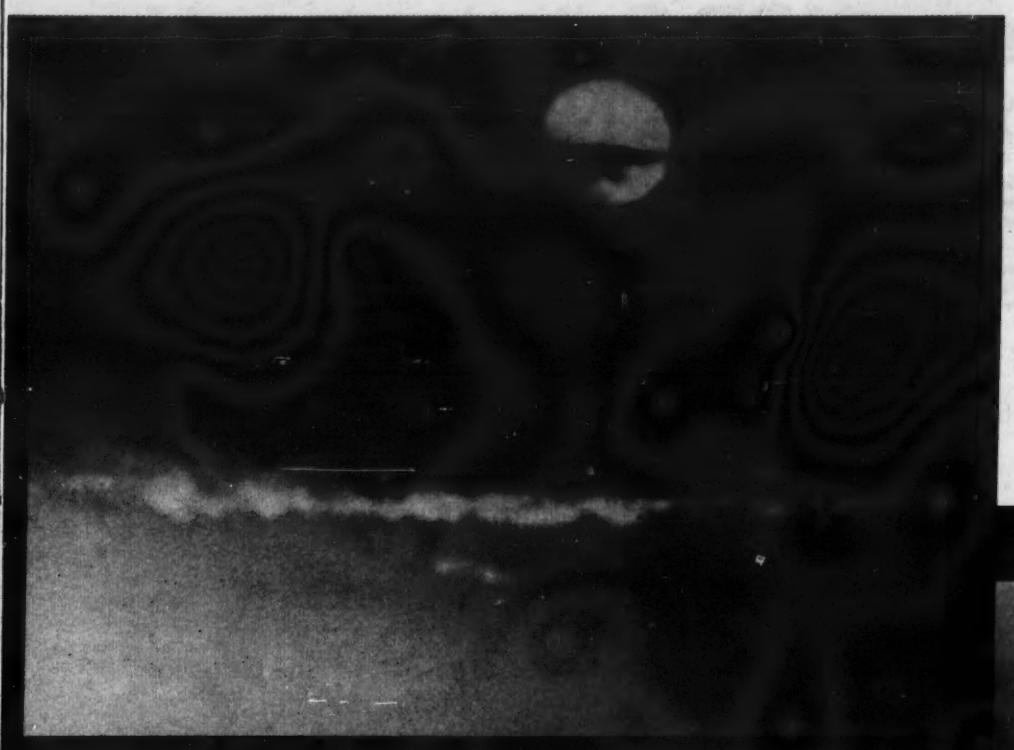

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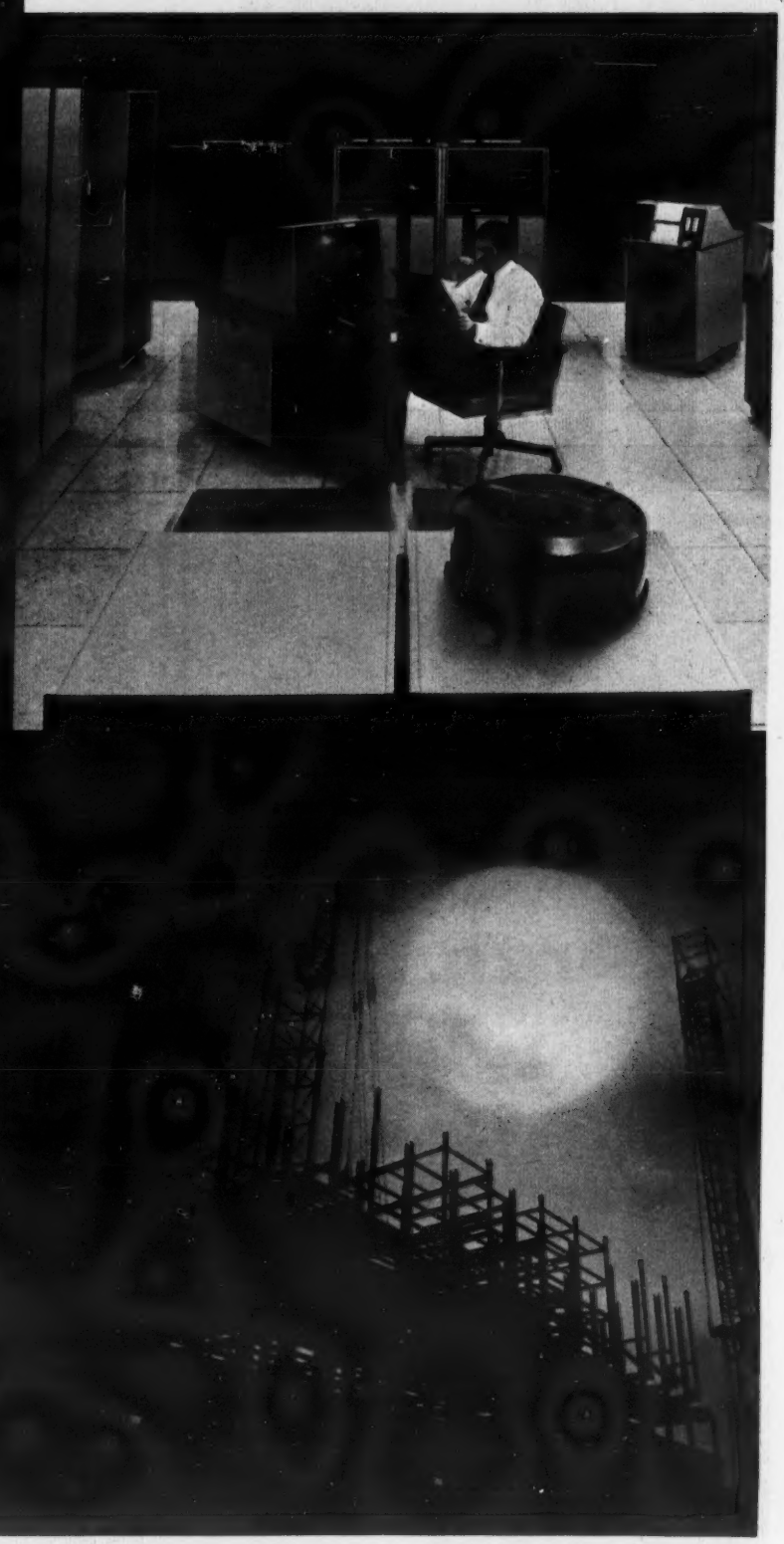

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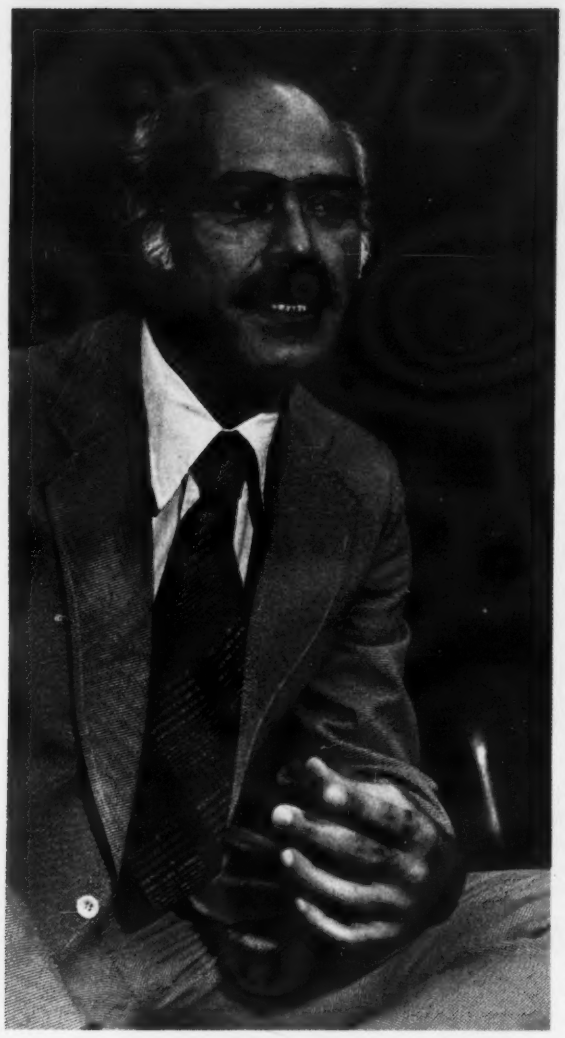

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Nine Parameters Suggested For Evaluation of Services

(Continued from Page 29)

the time required to establish a connection between a calling terminal and a called terminal.

In the case of automatic dialing units, the establishment time does impose a significant delay before the computer can begin its transaction with the remote terminal, he said.

Network Delay Time

Network delay is the time required for data to travel through the network to the receiving terminal or computer. This can be caused by many factors, particularly those at the terminal facility, Grubb explained.

Large network delays can seriously impede information interchange and the system may have to provide buffer storage as a solution, he added.

The line turnaround delay is defined as the time required to reverse the transmission direction of a half-duplex line. It reduces the effective transfer rate and can be corrected with full-duplex facilities, he said.

Transparency was defined as the absence of code or procedural constraints imposed by the telecommunications facility. System changes or user education may be required to compensate for lack of transparency in a network, Grubb said. Because of protocol conventions and other technical considerations, present networks are "quite opaque," he noted.

Security was listed as the last parameter and described as the ability to protect the information being transferred on the network.

The importance of security is dependent on the application. The network is vulnerable to unauthorized disclosure of information being transmitted unless specific security measures are instituted, Grubb explained.

These parameters were described as non-exhaustive, but they were called key factors for users to consider when evaluating a network service.

Grubb's presentation was taken from a paper called the "Criteria for the Evaluation of Data Communications Services" published by Grubb and Ira Cotton in the proceedings of the NBS Computer Network Symposium.

The proceedings are available from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th St., New York, N.Y.

Digital Data Analyzer Determines Errors

STAMFORD, Conn. – The DMS-303A test set from Dataproducts Corp. is a solid-state digital data analyzer designed to determine error-rate and signal distortion present in communications equipment and systems.

The magnitude of distortion, bit error count, parity error count and loop current is displayed on a front-panel multiscale meter. Parity error detection is shown on a front-panel lamp and the type of distortion is also displayed on front-panel lamps, according to a Dataproducts spokesman.

Sixteen switch-selectable data rates up to 9,600 bit/sec, asynchronous and synchronous operation, a range of interfaces, high-level neutral and polar loop and an electronic Bell System hub are standard features on the analyzer, the company said.

The DMS-303A can be rack-mounted or supplied with a portable carrying case; the carrying case lid contains storage for the power cord, test cables and, if desired, special data terminal and data set interface test adapters.

The DMS-303A is priced at about $1,790, he said from 17 Amelia Place, Stamford, Conn. 06902.

Univac DCA Supports Variety of Networks

(Continued from Page 29)

other vendors' equipment and the user is able to mix character-oriented terminal subsystems with bit-oriented terminal subsystems on different lines in the same network. The DCA concept is designed to retain compatibility with existing equipment, the spokesman noted.

Telcon network software can distribute communications functions among network processors to remove communications overhead from mainframes.

CCI Has 360/370 Controller

TORRANCE, Calif. – Computer Communications, Inc. (CCI) has introduced a plug-compatible replacement for IBM 270X devices and 370X communications control units operating in emulation mode.

The CC-8 is a communications processing system which operates as a front end to one or more IBM 360/370 mainframes, allowing the CPUs to communicate with remote terminals over a variety of communication lines, CCI said.

Up to 240 lines can be attached to the CC-8, depending upon users' line speed requirements, according to a spokesman. The controller can handle line speeds ranging from 75 bit/sec to 230.4 kbit/sec and can support asynchronous transmission or binary synchronous communications, he said.

CCI product enhancements offered with the CC-8 system include memory utilizing 4K random-access memory (RAM) chips and a line interface base with line sets capable of handling a mix of medium-speed asynchronous and binary synchronous lines up to 9,600 bit/sec, the company said.

The chips are said to offer single- and double-bit error-correction capabilities.

A CC-8 system is upward-compatible and field-upgradable with the firm's higher performance CC-80 communications processor.

The CC-8 costs $39,000 with a "moderate" line configuration and the capability to interface one IBM 360/370; it can be leased for $1,100/mo, including maintenance, CCI said from 2610 Columbia St., Torrance, Calif. 90503.

You Don't Have to Know This...

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P10-326:  320-120.     03-76. 00.       ERA, R#0;  OCT: 120.  ADDTN BITS
P10-330:  231-052.     03-77. 00.       STA, I#1;  III.       SBU OPCODE
P10-332:  200-200.     03-78. 00.       LDA, R#0;  ADL: TRD.  GET TRD LOCATN
P10-334:  231-050.     03-79. 00.       STA, R#1;  III.       III OPERAND
P10-336:  101-230.     03-80. 00.       BRU, OPT              GO OUTPUT SEG
P10-340:  241-001.     03-81. 00. CC2   ADX, R#1;  OCT: 001.  KYC+MAXI7
P10-342:  350-001.     03-82. 00.       CPA, R#0;  R#1.
P10-344:  111-024.     03-83. 00.       BRH, CC4.
P10-346:  123-037.     03-84. 00.       SBE, EEE;             DSPLY MAXI SFI
P10-350:  123-112.     03-85. 00.       SBU, EE2.             DSPLY MAXI TYP
P10-352:  201-024.     03-86. 00.       LDX, R#1;  ADL: DYC.
P10-354:  231-010.     03-87. 00.       STA, R#1;  DVC.
P10-356:  123-177.     03-88. 00.       SBU, EE3.             DSPLY MAXI COD
P10-360:  201-025.     03-89. 00.       LDX, R#1;  ADL: COD.
P10-362:  231-010.     03-90. 00.       STA, R#1;  COD.
P10-364:  123-010.     03-01. 00.       SBU, DDD.
P10-366:  123-146.     03-92. 00.       SBU, EE4.
                       *03-93. 00. ****GEN SBU RTP INSTR AT III DRIVER****
P10-370:  001-113.     03-94. 00.       LDX, R#1;  III-1.     FIND SMS III-1
P10-372:  200-050.     03-95. 00.       LDA, R#0;  ADR: RTP.  FIND RTP PAGE
P10-374:  230-002.     03-96. 00.       STA, R#0;  R#2.       SAVE PAGE
P10-376:  300-070.     03-97. 00.       ANA, R#0;  OCT: 070.  PASS 3,4,5, BIT
P11-000:  240-340.     03-98. 00.       SUA, R#0;  OCT: 040.
P11-002:  231-052.     03-99. 00.       STA, I#1;  III.       CHG SMS OPERAN
P11-004:  210-002.     04-00. 00.       LDA, R#0;  R#2.       GET SAVED PG
P11-006:  302-377.     04-01. 00.       SAN, S#2;  OCT: 377.  CORRECTION FAC
P11-010:  300-007.     04-02. 00.       ANA, R#0;  OCT: 007.  PASS 0, 1, 2, BIT
P11-012:  320-120.     04-03. 00.       ERA, R#0;  OCT: 120.  GEN SBU OPCD
P11-014:  231-052.     04-04. 00.       STA, I#1;  III.       CHG SBU OPCD
P11-016:  200-274.     04-05. 00.       LDA, R#0;  ADL: RIP.  GET RTP LOC
P11-020:  231-050.     04-06. 00.       STA, R#1;  III.       CHG SBU OPERAN
P11-022:  101-230.     04-07. 00.       BUR, OTP.             GK OUTPUT DVI
P11-024:  241-001.     04-08. 00. CC4:  ADX, R#1;  OCT: 001.  KEYBOARD
P11-026:  340-001.     04-09. 00.       CPA, R#0;  R#1.
P11-030:  111-070.     04-10. 00.       BRH, CC7.
P11-032:  123-337.     04-11. 00.       SBE, KKK.             DSPLY KEYBOARD
                       *04-12. 00. ****GEN SBU KBD INSTRU # III DRIVER****
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Reduces Errors in County Reports

Local TV Station Beats Rivals in Election Coverage

By John P. Hebert
Of the CW Staff

KANSAS CITY, Mo. – A local television station remained 35 to 50 minutes ahead of the competition and reduced the percentage of error in reporting county election results with a terminal-based communications system, according to the station's producer of election coverage.

Although American Broadcasting Corp.-affiliate WDAF-TV here has computers for the business side of broadcasting, it employed a separate data communications network with five terminals to better its coverage in the past three primary and general elections, Barry Morris said.

The star of this year's WDAF election night shows was an International Communications Corp. (ICC)/Milgo 40+ Data Display System terminal tied to a United Computing Systems (UCS) time-sharing mainframe across town and low-speed terminals at each of four county election board headquarters, Morris said.

One of the station's cameras was trained on the 40+ CRT screen while an operator seated out of view called up any one of the 75 political races of the election from the terminal's detached keyboard, he said.

Looks Good on Air

WDAF relies on the terminal-based system because it looks good and is faster and more accurate than the archaic, manual tally boards for on-air display that it replaced, Morris explained.

Before the terminals were used, WDAF posted a person at each county election board headquarters to phone updated results to the station newsroom for its two-state, five-county election coverage.

With all of the activity concentrated in the newsroom, phone lines were constantly tied up, Morris said, adding additional time was lost conveying and recording the information and relaying it to the TV studio.

After the written information reached the studio from the newsroom, more time was spent making up status cards to manually post on the tally boards, resulting in a time-consuming, error-prone process, he said.

Alternatives Attempted

Over the past four years, UCS engineers and WDAF producers tried different terminal alternatives. In 1972, the terminal used displayed numbers too small, Morris said.

During the 1974 elections, a 30-char./sec terminal built by UCS engineers wasn't fast enough, according to John Burke, UCS senior analyst.

This year, UCS and WDAF employees contemplated using a Bell Dataspeed 40 terminal for on-the-air display, but the device displayed control characters along with election results, Morris said.

UCS borrowed the 1,200 bit/sec ICC/Milgo 40+ for the August primary and, even though Bell came out with a Dataspeed 40 which didn't display control characters, UCS and WDAF were already familiar with the ICC device, Morris explained.

Television station technical people worked on different ways to make the picture sharper for the November elections and found keying over a color mat with station-switching equipment and utilizing a high-resolution black and white TV camera with a special lens would give clarity and precision to the terminal's dot matrix characters for black and white and color TV viewers, Morris and Burke said.

WDAF cameramen finished shooting the station's regular programs early on election day and went out to the county election board headquarters where they "traded their cameras for terminals" and keyed results into Computer Device, Inc. 30-char./sec portable Teleterms, Burke said.

Two phone lines were installed at the field sites for communications with the UCS computer center and voice communications with both sites, Burke said.

The election results were transmitted over the dial circuits to one of UCS' mainframes, a 262K-word, 60-bit memory Control Data Corp. Cyber 174 with CDC and California Computer Products, Inc. disks with capacities of 6G characters, according to the UCS senior analyst.

The CPU stored the updated results in the CPU's program for accessing by the 40+ at WDAF over the final dial-up link.

There were no major problems with the system operation during the elections, although during the system setup, Bell got the lines crossed and put the telephones into the public address system at one of the county board headquarters, he said.

Viewership Increased

Both Morris and Terry Connelly, WDAF news director, agreed there was a definite increase in viewership on the election nights this year.

Morris said independent surveys were taken on those nights and "we saw we were constantly ahead of the competition, but we don't know exactly how much."

"It's always a rough night to rate," Connelly commented, adding one of the main advantages of the display was to help the image and prestige of the station. "It's better all the way around," he said.

WDAF's audience has increased significantly over the last few years and the terminal must be one of the factors, Connelly surmised.

"The candidates say they watch WDAF because we [give] the best results faster," he added.

"It's a good application of computers for that specific purpose – it's more accurate," Morris noted.

Terminal Transactions

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MSI Adds Cassette, Scan Features to Portable Line

COSTA MESA, Calif. – MSI Data Corp. has added the Source 2200 data entry terminal with cassette recorder to its line of portable terminals.

The Source 2200 has an optical wand scanner which can read the MSI Scannable Bar Code and Monarch Marking Systems' Codabar code, according to an MSI spokesman.

The terminal features a 16-character display with the optional capability of "rolling over" to accept entries up to 32 characters long, often required for Codabar applications, he noted.

MSI also has a rechargeable cartridge battery – utilized for the first time by the 2200 – enabling the user to continue gathering data by replacing the low battery with a charged battery cartridge, the spokesman noted.

MSI can retrofit the rechargeable cartridges to existing MSI Source 2100 terminals in the field, it said.

MSI is offering a wider selection of transmission rates for the 2200 than with previous MSI terminals, including 110-, 200-, 300- and 600 bit/sec for teletypewriter-compatible transmissions as well as speeds of 1,200- and 1,350 bit/sec.

Codes include standard 8-bit Ascii and 5-bit binary, according to the firm.

The terminal's keyboard is a 10-key numeric pad with 10 other function and command keys, including conversion symbols as an operator reference in using the Codabar codes, the spokesman noted.

Cassette capacity is about 90K characters on a side or 180K char./cassette rather than the 250K-character capacity of the Source 2100, the spokesman said, adding the 2200's tape moves faster for more accurate data recording.

A standard plug on the back of the terminal accepts a jack from an acoustic coupler, which is available as an optional accessory. Interfaces are available for teletypewriter transmission at 110 bit/sec asynchronous Ascii transmission for an additional cost, he said.

Other features include search and end-of-data modes; a built-in accumulator for tracking the total number of items ordered, monitored or shipped; and a battery indicator to display the amount of charge present in the battery.

The Source 2200 will be available in January and cost between $2,200 and $3,500, MSI said from 340 Fischer Ave., Costa Mesa, Calif. 92627.

CRT Has Two Screen Capacities

TUCSON, Ariz. – The Tele-TEC Model 1445 CRT/keyboard terminal from TEC, Inc. is a teletypewriter replacement that reportedly simplifies conversational interaction.

The terminal provides switch-selectable CRT screen capacities of 1,920 characters in a 24-line by 80-character format or a 960-character format, TEC said.

The Model 1445 also has a detachable keyboard that allows entry of 64 upper-case characters along with top-line entry and automatic rollup. Automatic line feed and carriage return are reportedly switch-selectable and a blinking underline cursor and a variety of cursor controls are standard.

Other standard features include a monitor mode permitting display of control codes, RS-232C, TTL or 20/60 mA current loop interfaces and switch-selectable transmission rates from 75- to 9,600 bit/sec, the company said.

The terminal operates in half- or full-duplex conversational mode, serial asynchronous and Ascii with odd, even or no parity; 10- or 11-bit characters are switch-selectable, it said.

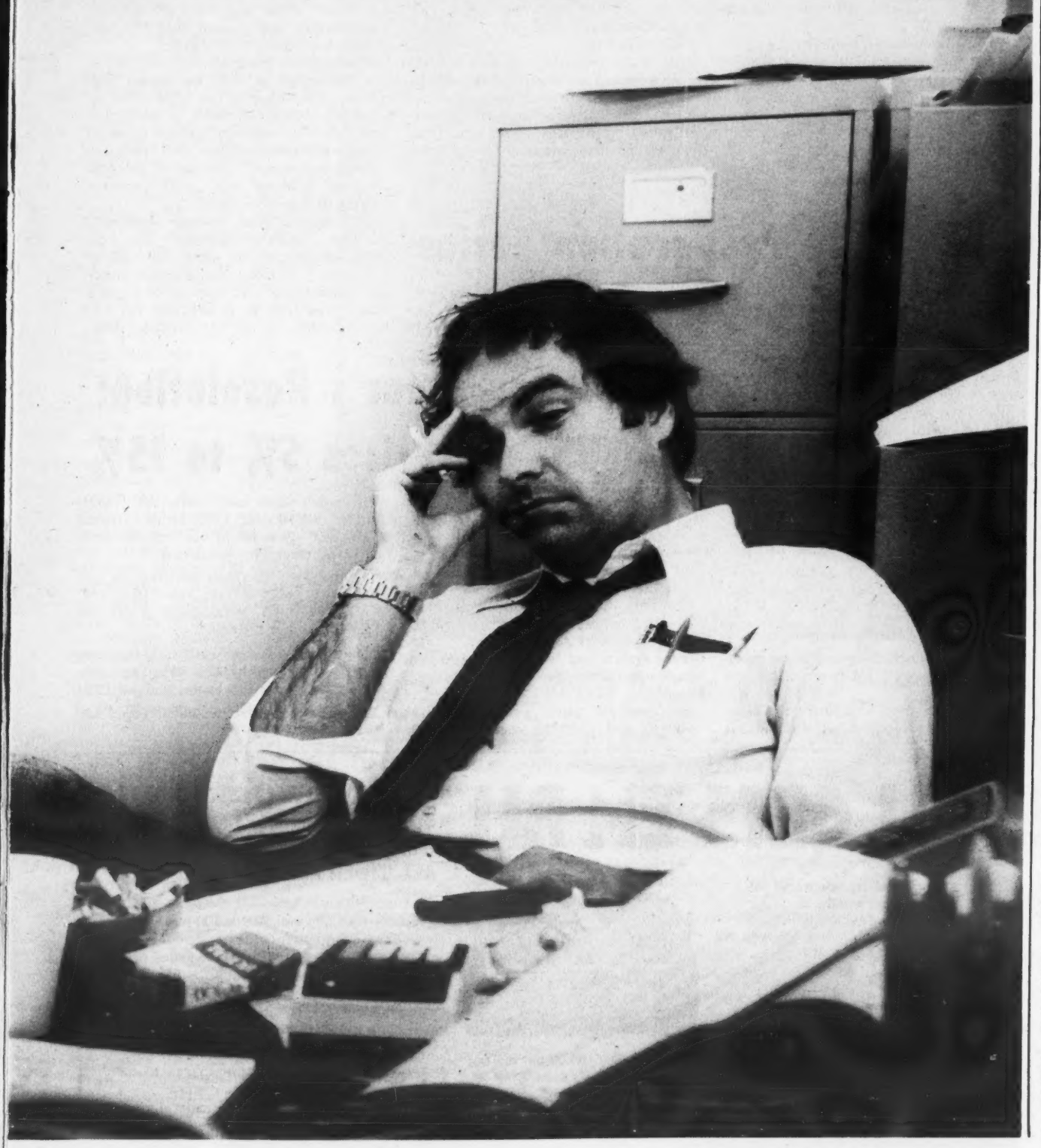
Options include lower-case characters to complete the 128-character Ascii set, rack mounting, auxiliary I/O port for printer or data storage devices and a numeric pad.

A composite video for connection is also available for connection of remote monitors, as is an optional keyboard with single key cursor controls with or without a numeric pad, a TEC spokesman noted.

The Model 1445 can be utilized in single machine dial-up applications or multiple station hard-wired systems, he said.

The teletypewriter replacement costs $1,465 from TEC at 2727 N. Fairview, Tucson, Ariz. 85705.

oftware heartaches



Terminal Transactions

Wuds Unit Operates On Dial, TWX Nets

MAHWAH, N.J. – Western Union Data Service Co. (Wuds) has introduced a dual-function capability for Teletype Corp. terminals which allows users to perform applications over dial-up telephone lines and also access the TWX teletypewriter network.

The Exchange Data Terminal (EDT) 33 ASR Plus TWX 10 char./sec terminal is equipped as an automatic send/receive configuration providing paper tape operation, according to the company.

Two telephone handsets are utilized – one for voice and data use on the Direct-Distance Dial (DDD) network and the other for the TWX network, a Wuds spokesman noted.

The EDT 33 ASR Plus TWX is intended for businesses needing a dial-up terminal for remote data entry, time-sharing and other data applications, but which also have communications requirements, he said.

When the terminal is switched to the TWX network – by picking up the TWX phone receiver – it can transmit at the 10 char./sec speed to other EDT 33s and 300s equipped for TWX and to other TWX terminals, he explained.

Other features of the terminal include automatic answering, optional speed restraint to communicate with slower international Telex terminals and a single answerback for TWX and DDD use, he said.

EDT 33ASR Plus TWX lease prices begin at $98/mo; the unit can be purchased for $2,290 or $2,307 with the speed restraint feature, the spokesman said.

Wuds is located at 70 McKee Drive, Mahwah, N.J. 07430.

Xerox Software Tops Survey List

Large Mainframe Users Rate DEC Equipment Best

DELRAN, N.J. – Users of Digital Equipment Corp. large-scale systems are more satisfied with their mainframes than users of any other make of general-purpose systems, according to a survey by Datapro Research Corp.

DEC won the accolade for the third year in a row, Datapro said, and placed first in ease of operation, reliability of peripherals, reliability of mainframe (tied with Xerox), ease of programming and conversion and overall satisfaction.

Xerox, despite its withdrawal from the mainframe arena, led the list for its software with a top rating of 3.4 for its compilers and assemblers and 3.7 for its operating systems, the eight-page report said.

The survey covered 1,765 users with a total of 2,095 systems.

Users were asked to rate the systems as excellent, good, fair or poor on 12 aspects of equipment, software and vendor support. A "weighted average" for each category was calculated after assigning a rating of 4 to the excellent ratings, 3 to good, 2 to fair and 1 to poor.

Sample size varied from the 1,257 IBM users who replied to the six Amdahl users who returned the survey.

In overall user satisfaction DEC rated 3.7, Xerox 3.4, Amdahl 3.2, IBM and Univac 3.1, Burroughs and Control Data Corp. 3.0, Honeywell 2.9 and NCR 2.8, the report stated.

	Amdahl	Burroughs	Control Data	Digital Equipment	Honeywell	IBM	NCR	Univac	Xerox
Ease of operation	2*	3*	4	1	6	5*	3*	5*	2*
Reliability of mainframe	5	6	7	1*	4*	2	3	4*	1*
Reliability of peripherals	3	7	6	1	5*	2	4*	5*	4*
Responsiveness of maintenance service	1	7	4	3	6	5*	2	5*	5*
Effectiveness of maintenance service	1	7	4*	3*	6	3*	2	5	4*
Technical support	1	7	3*	2	4	6*	6*	3*	5
Operating systems	6	2*	5*	2*	5*	5*	3	4	1
Compilers and assemblers	6	3	5	2	4*	4*	4*	4*	1
Applications programs	–	4*	1	5	4*	2*	3	2*	6
Ease of programming	3*	2	7*	1	5	6	7*	4	3*
Ease of conversion	2	3*	4*	1	5*	5*	4*	3*	3*
Overall satisfaction	3	5*	5*	1	6	4*	4*	4*	2

*Tie

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Manufacturers' Rankings According to Weighted Average User Ratings

Amdahl rated tops in responsiveness of service, effectiveness of maintenance service and technical support; Control Data's applications programs were rated highest by the users.

IBM systems composed 69% of the total systems represented in the survey, Datapro noted, and so in order to see how non-IBM systems rated against IBM units, a set of weighted responses was calculated. "Non-IBM systems were collectively rated higher than IBM systems in the following seven categories: ease of operation, responsiveness of maintenance service, technical support, operating systems, compilers and assemblers, ease of programming and ease of conversion," the report stated.

Most of the users surveyed were running business DP applications on their systems, with data communication ranking second and data base management ranking third. Control Data and DEC users were using their mainframes primarily in the scientific and engineering areas, the report noted.

Use of software was also evaluated in the report. While most users had in-house programming staffs, most also relied on outside packages for assistance.

Respondents used alternative sources for peripherals as well, the report indicated. "Responses in the 'other devices' category included printers, graphic plotters, Micr devices and various types of remote terminals and front-end communications processors." The use of independent peripherals was most common among IBM users, it added.

The report, "User Ratings of General Purpose Computer Systems," also contains information on users' methods of acquisition, remote terminal usage, principal applications and sources of applications programs. It is available for $12 from Datapro at 1805 Underwood Blvd., 08075.

For High-Volume Input

Burroughs Expands AE Data Preparation Series

DETROIT – Burroughs Corp. has announced an additional series of audit entry data preparation systems called the AE 400 and three more models in its AE 500 series.

The AE systems were designed for users who prepare large volumes of computer input data, according to a spokesman. They edit, validate and capture ready-to-process data on the firm's "super minidisks," industry-compatible minidisks or magnetic tape cassettes, the company said.

Editing Capabilities

Editing capabilities include range checking, check-digit verification and arithmetic proofing.

Data prepared on the AE systems can be input to both Burroughs and other manufacturers' mainframes, the spokesman added. Data can be directly transmitted over communications lines, he noted, with errors detected and corrected at the point of entry.

The Audit Entry Language used by the system is said to provide users with a means of formatting programs based on the nature of the data entered into the system.

The AE 412 includes a standard alphanumeric keyboard, separate 10-key pad, function keys, 16 program select keys, a 60 char./sec matrix printer, 240-character self-scan visual display panel and a 243K-byte minidisk.

The system simultaneously prints an audit journal to assist the operator and permit subsequent auditing, the firm said.

The AE 422 is a nonprinting version of the 412.

The AE 511 has the same physical characteristics as the AE 412, Burroughs said, except it includes a magnetic tape cassette.

Super Minidisk Drive

The AE 513 includes a Burroughs super minidisk drive with 1M bytes of storage capacity.

The AE 422 costs $7,150 for the basic system and leases for $264/mo; the AE 412 costs $9,150 and leases for $335/mo. The AE 511 costs $10,450 or $415/mo to lease, while the AE 513 costs $10,250 or $410/mo.

Univac New Year's Resolution: Hike Upkeep Prices 5% to 15%

BLUE BELL, Pa. – Univac has increased maintenance prices 5% to 15% on selected equipment effective Jan. 1.

Maintenance prices have been decreased for other more active equipment, a spokesman noted.

The only "active" products caught in the maintenance price increase are the 1900 Computer-Assisted Data Entry (Cade) system and the Univac 1106 "for which some orders are still being taken," he said.

Decreased in price were the Univac 1100/10 and 1100/20 systems and the 8433 disk drive used with the 90/60, 90/70, 90/80 and 1100 series systems. The 10% decrease in cost affects both CPU and memory, Univac said.

"Nonactive" products affected by the increased prices include the 1108, 494, 418 II, 418 III, 9400, 9480, 9300 and 9200 computer systems.

Maintenance for the 1106 CPU has been increased in price by 13% while the memory maintenance has been increased 12%.

The Cade 1900 system's maintenance has been increased by 15%.

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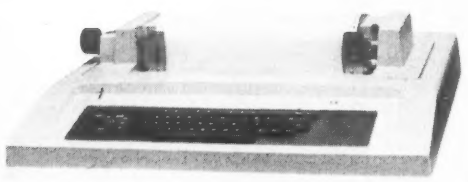

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Control System Cuts Downtime, Inventory Costs

By Joseph R. Giles
Special to Computerworld

LAUREL, Miss. – Within the last year, the average downtime of Masonite Corp.'s primary production machines here has improved, while maintenance costs have declined – despite the addition of a new hardboard production machine and two more coating plants.

Further, since November 1974, stores inventory has been reduced by about $30,000 a month. The cuts in obsolete and excess inventory should continue for at least another year, for a total reduction of well over $500,000 – despite continuing plant expansions and the installation of new equipment, which require an increased variety of parts stocked.

Naturally, many factors contributed to these improved operating efficiencies. But one that continues to play a role is a new maintenance and storeroom inventory control system that works in conjunction with an IBM 370/135.

Designed with the help of maintenance department personnel, this on-line system stores current and interrelated data and provides information – via CRT terminals and periodic printed reports – that enables us to maintain control over labor and material costs, manage stores movement and achieve improved departmental efficiency.

This "handle" on the entire maintenance operation was not possible using manual administrative procedures because of the size of the Laurel plant, the number of people and the quantities of machines and material involved. Our facility has nearly 50 acres under roof and employs almost 2,000 workers to produce well over a billion square feet of Masonite brand hardboard a year for use in interior paneling, exterior siding and industrial applications.

The Laurel maintenance department includes 375 hourly employees and 35 supervisory persons who are responsible for seven major board production machines, four coating plants and finishing and refinishing departments. Despite the size and complexity of the maintenance effort, the on-line system enables us to track almost every activity and analyze costs soon enough to take corrective action.

For example, there are IBM 3270 display terminals installed in the maintenance planning office, main storeroom, garage storeroom and receiving department. If the manager of maintenance and engineering wants to know, for instance, how much was spent maintaining three presses in a particular unit, he can determine through a terminal the maintenance costs for any month within the last year or for the entire year. This type of data is also available in periodic reports produced by the system.

Similarly, the system can provide data on the working hours per crew, performance on each job and overall performance.

In addition, other information supplied by the system can help supervisory personnel plan more efficiently and order the exact parts required for various maintenance jobs. Or they can examine reports covering a 12-month cost history on each piece of equipment, including parts usage. This information, supported by work order detail, can be used to justify replacing parts rather than repairing them when they fail.

Job Time Pinpointed

Work orders can be placed in one of several categories including repair, replace, modification, emergency and capital expenditure projects. A weekly printout pinpoints how much time each crew spent on each type of order.

Every Tuesday night the schedulers and planners also can determine the amount of dollars spent on each capital project through the past Sunday. In the past, they had to wait until the end of the month for such information, which was often too late to permit corrective action.

A work order requisition is routed to one of seven planners, who determine – based on data stored in the system – the number of men and length of the time required for a job and the materials needed. The planner also designates which of 21 crews will handle the job.

The requisition is then forwarded to a clerk who enters the data into the computer through a terminal in the planning department. The clerk also places a copy of the requisition on the appropriate foreman's board.

Each day, the maintenance scheduler reviews these boards and meets with the foremen at 10 a.m. Schedules for the following day, including new work orders added, go to the foreman by noon each day.

As a result of this system, our maintenance program operates more efficiently, inventories are better and more economically balanced and maintenance costs have been substantially reduced.

But maintenance should never be an end in itself. By far, the most important result of our improved efficiency is the increased uptime of the primary production machines.

Giles is maintenance planning superintendent at Masonite.

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Firm Uses Data Entry to Solve Data Base Problems

SOMERVILLE, N.J. – Using an intelligent key-to-disk system, a pharmaceutical firm here has solved several critical problems relating to the maintenance of data bases on experimental drug compounds.

Researchers in pharmacology, chemistry and toxicology at Hoechst-Roussel Pharmaceutical Co. are using an on-site Datapoint Corp. Diskette 1100 to enter data into a local storage media and subsequently into the company master files maintained on a nearby IBM 370/158.

Transmission from the unit to the IBM system occurs on a disk-to-disk basis via leased line connection. More than 50 researchers regularly use the system for data entry with the help of a specially trained unit operator, the firm stated.

The operator keys in input data which consists primarily of the results of tests, or "screens," conducted on laboratory animals with new drug compounds.

"The control of research data is important," according to Michael Crocco, scientific systems coordinator for American Hoechst, the firm's parent company. "So much so that source documents cannot be removed from the experimental area, even to a data entry department.

"Hence, the great advantage of the Datapoint unit is the fact it is located in the research department, allowing the scientist to monitor the data to insure complete accuracy," Crocco said.

"The unit allows the bench scientist to have rapid data storage and data retrieval which would not be possible manually," Dr. William Novick, director of pharmacology, noted. "The unique feature of the diskette is that it is located in the laboratory environment and has easy access as a research tool."

Entry of data into the system is simplified by the use of a turnkey system, tailored to meet the particular needs of the research department. The Remote Off-line Data Entry (Rodent) program module allows operation of the various functions programmed into the 1100 with minimal operator interface, Novick said.

Guided by Rodent, the operator can invoke any subsystem module with "self-help" instructional displays, he added.

During the past year, experimental data maintained on tests conducted in the basic research areas have been undergoing conversion into computer media with the Datapoint unit, ultimately being transmitted to the IBM 370-maintained master file.

"The conversion process is well underway," according to Marion Trost, project programmer /analyst mainly responsible for the system work.

"With our new approach, researchers achieve complete control over the entire body of experimental results generated by a particular Hoechst compound while retaining the confidentiality of their data," she explained.

Daily screening results are transferred directly from laboratory data sheets to temporary storage in the 1100. This information, as well as historic information maintained in the IBM 370/158 is accessible to researchers with a data management package.

"The data entry and editing facilities of the Datapoint combined with ease of communications with the 370 provide us with a truly distributed processing capability without sacrificing security," Dennis Devlin, a Hoechst systems analyst said.

The 1100 system at Hoechst-Roussel consists of a Datapoint 1100 business processor; a full typewriter keyboard; floppy disks, each capable of storing 256,000 characters of information; and a servo printer unit which can be used to print out data files either stored locally on the diskette unit or by transfer from the 370/158 master file.

Chrysler 'Doubled Projected Savings' With Installation of 11 COM Systems

SAN FRANCISCO – With the recent installation of 11 computer output microfilm (COM) systems, Chrysler Corp. has "doubled [its] projected savings," according to G.T. Boase, manager of assembly systems.

"If we continue on our present course, we should realize savings in excess of $1 million annually," Boase told attendees of the annual shareholders meeting of Quantor Corp., whose COM systems are being used by the huge auto manufacturer.

In addition to the 11 systems already installed, Chrysler has a 12th system on order, Boase said.

In an effort to reduce costs, Chrysler undertook an extensive study of its DP activity during 1974-75.

Factors involved in this study were the need to reduce costs, the increased cost of paper, paper coming into short supply and the increased demand for reports, he stated.

"Early in our study, we decided on microfiche over roll-type film because it was best suited to our requirements." In addition, the reduced cost of viewers for microfiche was a major factor in the decision – a comparison of seven to one in favor of microfiche.

Following this decision, Chrysler conducted "an extensive evaluation of available equipment and manufacturers. Our specifications narrowed our evaluation to a possible five producers of microfiche equipment," he said.

Among the criteria the company selected were high-quality microfiche; the one vendor approach for recorder; duplicator and supplies; and competitive cost.

"With this criteria, we installed a microfiche recorder and duplicator for about a year at our Belvidere, Ill., assembly plant," Boase continued.

Chrysler carried out a four-month evaluation of the five selected manufacturers' equipment.

The evaluation involved visiting 11 user sites; a telephone survey of 23 users completing a 11-point questionnaire; requiring each manufacturer to use its software with Chrysler specifications and data to run benchmarks on typical job applications; actual operation of the equipment by Chrysler personnel; and many meetings and seminars with each of the individual manufacturers.

The equipment is "presently producing at a rate of over six million microfiche pages per week. This is over twice the projection we made during our evaluation," he reported.

Chrysler currently has 781 applications on microfiche with most used on a daily basis.

In addition to the economic benefits, "we have achieved many other benefits such as reduced computer output print time, reduced storage requirements, and reduced manpower requirements for distribution, filing and retrieval of data.

"File integrity is better maintained since a page from a report of microfiche file cannot be removed and clarity of all copies has improved. Mailing costs are reduced and disposal costs are reduced from truck loads to cartons," he added.

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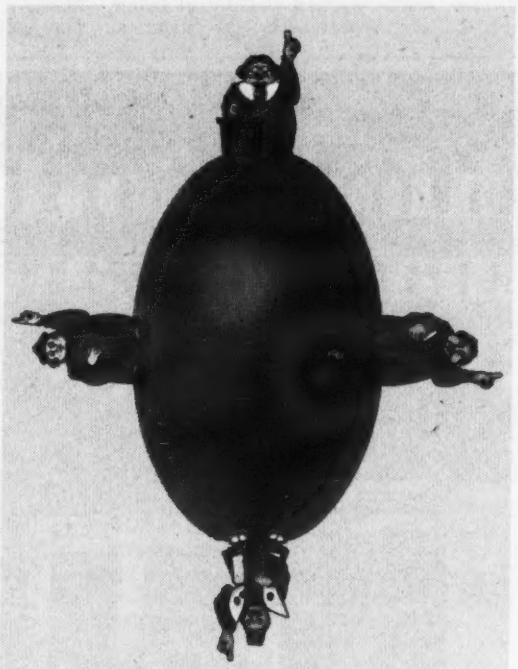

compatible Four-Phase systems at a few key sites. On these pilot installations, field-proven software speeds the implementation of local transaction processing, local data base management, report generation and communication with the central computer.

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Color Coding Aids Handling

Reconfigured Library Expands Storage Capacity

LOS ANGELES – By reconfiguring its expanding tape library, Western Airlines here has been able to store about 10,000 tapes in an area previously thought "full" with 1,500 tapes, according to Pete Taddeo, Western's director of information services.

The three-shift, 24-hour shop increased efficiency by switching to 6,250 bit/in. tapes, and it improved tape handling accuracy through a color-coded system from Tab Products Co., which includes tape cartridges compatible with self-loading drives and horizontal tape filing racks.

Each self-loading cartridge has its own self-adhesive tape identification number affixed to the circumference of the cartridge, Taddeo explained. This tape identification, utilizing Tab Products' Compucolor labeling system, displays each of up to five digits in a spectrum of colors assigned to digits 0 through 9.

Two hooks are incorporated around the circumference of a cartridge. As a result a reel may be positioned in a rack with the color-coded identification number angled either upward or downward.

The two terminal digits on each Western Airline cartridge are repeated in the identical color code. They are positioned in a built-in label holder in the racks directly above the corresponding cartridge storage. This way, the return of a cartridge to its current position is made visually easier, Taddeo said.

"A misfile under our new system is indeed a rarity. And if one is inadvertently made, the clash of an out-of-phase color makes it easy to locate the misfiled reel," he said. Formerly if a tape was missing an audit usually resulted. That required up to nine hours of tedious checking of tape identification numbers against a library printout.

Western's central computing facility uses 24 IBM 3420-type tape drives, shareable among two IBM 360/65s and a 370/158. Approximately 1,200 tape mountings are made daily. Since the Tab Products cartridges are self-loading, tape mountings require about 50 seconds less than formerly when reels had to be removed from cannisters and tapes manually threaded into drives, he said.

Without the necessity of removing tapes from cannisters, operators can carry up to six cartridges at once. Thus they can mount them on various drives as they are decreed available for new tapes by the system's console. As a result approximately 10 hours of operator time is saved daily.

Savings in tape handling time is not confined to computer operations. With the cartridges, Western finds it saves approximately 15 seconds per reel change in librarian time. The result is another five hours saved daily.

In addition, with the self-loading cartridges, tape is not exposed to airborne contaminants. The tape is exposed only behind the sealed window of a drive, which is filtered continuously and cleaned in accordance with a preventive maintenance schedule, he noted.

Also, the chance of inadvertently dragging a leading edge on the floor upon mounting is precluded, so the chance of data dropout or fouling a drive's read/write head and the propagation of errors on successive tapes is reduced, he said.

Since the circumference of a reel's flanges fits tightly within circular grooves molded into the cartridge, it is difficult to squeeze the flange accidentally and damage the edge of the tape.

Western also uses an evaluator/cleaner. Whenever an automated tape library monitoring program indicates a tape has been cycled five times, it is run through the evaluator. There it is checked for edge damage, and counts and locations of error-prone bit locations are logged. Upon rewinding the tape is cleaned, he said.

Correction

In "Baking Firm Whips Up Savings With Data Entry System" [CW, Nov. 22], the Univac Cade system at McKee Baking Co. cost $1,306/mo at installation. With the subsequent upgrade it cost $2,109/mo.

Our commitment to the tape drive market can be summed up this way:

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Sorry, Burroughs.

ADDS CONSUL 980B

Mini Bits

WE Semiconductor Memory DEC PDP-11 Compatible

HOUSTON – WE Computer Extension Systems has introduced a semiconductor memory system said to be hardware- and software-compatible with all models of the Digital Equipment Corp. PDP-11 minicomputer series.

The system has up to 16K by 16 bits of memory on a single quad board that plugs into one of the DD-11 small peripheral controller slots within the PDP-11 chassis, according to the firm.

Featuring a 4K by 1 NMOS static random access memory, the system needs no refresh circuitry, the firm said. The starting address location of each of the four independent 4K memories on the board can be set with a switch, it added.

A 16K by 16 board costs $1,650, a 12K by 16 board costs $1,050; and a 4K by 16 board costs $750, the firm said from 17311 El Camino Real, Houston, Texas 77058.

UDS Adds Line of Mini Interfaces

PHOENIX – United Data Services Co., Inc. (UDS) has a line of minicomputer interfaces that connect a standard Model 33 or 35 Teletype to the current-loop ports of Digital Equipment Corp., Data General Corp., Digital Computer Controls, Inc. and Hewlett-Packard Co. systems.

Each interface kit contains a tape reader controller, associated Teletype cabling and mounting hardware and a 16-ft signal and control cable with a plug-to-plug teletypewriter-compatible port connector, UDS said.

Kits for the Teletype Model 33 interface costs $75 each while the Teletype Model 35 interface kit costs $87. UDS is at 3024 N. 33rd Drive, Phoenix, Ariz. 85017.

Netcom Unit Designed for LSI/11

MOUNTAIN VIEW, Calif. – The P100 power fail/restart module from Netcom Products, Inc. was designed to be used with the Digital Equipment Corp. LSI-11 system.

The unit provides power status signals to the LSI-11 processor independent of the power supply, the firm said.

Circuits in the P100 continuously monitor ac and dc voltages and initiate processor interrupts to signal changing power conditions, Netcom stated.

The unit allows fault conditions to be detected in advance so the processor can shut down systematically.

The unit plugs directly into the LSI-11 backplane and costs $85 from the company at 566 Ellis Ave., Mountain View, Calif. 94040.

First Users Say

Service Called Key to Series/1 Choice

By Esther Surden
Of the CW Staff

The first users of the IBM Series/1 minicomputer introduced recently [CW, Nov. 22] cited service as their major criterion in choosing the systems.

The minis were installed in two locations before their release to the general public, IBM said.

"The big thing was service," according to Michael Schwarz, vice-president of Quaker City Motor Parts in Middletown, Del. "We have many stores in rural areas and we felt IBM could service them better."

Quaker, which has already begun software development on its one Series/1, has made a commitment to buy 50 systems to be used for accounts receivables and inventory applications in the firm's retail outlets. "We are looking to 100 to 130 units down the road," he added.

During the day the systems will operate independently, Schwarz explained, but at night they will receive up-to-date pricing information from the company's main computer, an IBM 3/15.

Strong IBM Shop

"I guess we are a very strong IBM shop," Schwarz noted. "We looked at other systems including one from Data General Corp., but for the price the Series/1 had the right capabilities and flexibility," he said.

Citibank of New York also said IBM's service and support were instrumental in its selection of the Series/1 for use in a transaction processing environment.

"It looks like it will be quite a cost-effective machine," Barry Young, head of the accounting and information services division of the bank's operating group, said.

The bank, which has a corporate commitment to decentralize its DP operations, has had two of the Series/1 minicomputers for several weeks and expects to have three more by the end of the year. Citibank expects to use a total of 30 of the systems, Young said.

"Citibank has done a thorough examination of minicomputers," Young noted, and the Series/1 falls "well within the range of the cost-effectiveness of other systems." In addition, IBM's "new RPQ policy," which has assigned a special group within IBM to help users configure systems and put together interfaces for special equipment was another attraction for the bank, he said.

The bank also liked what Young called the Series/1's "powerful instruction set" and the prospect that IBM will be expanding the line significantly in the future, Young said.

Citibank has a "negotiated price" for the Series/1, Young noted, adding he was not at liberty to discuss it.

Micros Seen as No Threat To DP Service Organization

By Esther Surden
Of the CW Staff

SANTA CLARA, Calif. – The DP department as a service organization has little to worry about when it comes to microprocessors, Paul Rosenfeld, Microcomputer Systems Corp.'s software product manager, said here recently.

"To the extent that he is running a service organization, the [DP] manager's users will want to take advantage of his expertise. He'll have an impact even when each department has an interactive system, because there won't be programming experts in each department.

"More programming will be done locally without going to the larger system," Rosenfeld said.

Computer power will be getting cheaper and easier to put in a very small box, he predicted. However, what is run on the central computer and what is run locally depend on the size of the program.

"If you have a large number-crunching program you need a large computer, but if you have a small program that can run overnight there's no reason to bother with the larger system," he added.

Some efficiency in terms of writing software will have to be achieved at the DP department level, he added, in order for the department to minimize the cost of writing code.

"Writing the software is not going to be any different than it is now, but not so much will have to be done in the maintenance area. Programmers will be doing more original things and pay a little more attention to what the costs are and how to make it more efficient," he added.

Transparent Micros

Right now, Rosenfeld said, microprocessors surround the DP manager but are transparent. They are in the system console and many I/O devices.

The manager doesn't have to worry about software for the systems because they are dedicated and supplied by the system maker, he noted.

"I think by the time the micros surface in the DP department, the manager may find the software tools are there and not so different as with the large CPU. The development process is much the same," he asserted.

Right now most of the processors are hidden and there aren't many user programmable systems available. Because the microcomputer comes from the semiconductor manufacturer and the minicomputer makers were already in the computer business, microcomputers have farther to go and it is unlikely that micro makers will get into the end user business, Rosenfeld said.

"I'm sure there will be canned software for micros sometime in the future," he added.

CM End-User Business System Intended for First-Time Users

LEBANON, Ohio – Cincinnati Milacron (CM) has an end-user business system intended for first-time users or individual departments of larger businesses.

The System 40, dubbed George, includes the firm's CIP/2200B CPU, four I/O ports for options, a CRT console, a printer controller, a 125 line/min printer, two floppy disk drives, two removable diskettes and a controller for up to four more drives, CM said.

Memory can be expanded to 64K.

System Options

Options for the system include a 300 line/min printer, a total of four additional floppy disk units with 630K bytes each, an 80-column card reader and a larger CRT console.

Included is the CM operating system called Cimos with an RPG compiler. Applications software is separately priced, the company noted.

Applications

Applications available include accounts payable, accounts receivable, general ledger and payroll.

The basic George system costs $16,100 and will be available in January, according to a spokesman for CM's Process Control Division, Department LR, Mason Road and Route 48, Lebanon, Ohio 45036.

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PRIME

Board Lets Users Design Controllers

BERKELEY, Calif. – A programmable interface board which allows the development of peripheral controllers for Data General Corp. (DG) Nova and Eclipse minicomputers is available from Teknekron, Inc.

The Teknekron CPI-660A permits the connection of nonstandard devices to the host computer; it also reduces the processor load of standard peripheral devices, the firm said.

The use of an Intel 8080A microprocessor as the control and arithmetic element permits customization through software, eliminating the necessity for hardware development, a spokesman indicated.

The CPI-660A accepts commands from the Nova or Eclipse and interprets the commands according to a program stored in its local memory.

This program performs the detailed sequencing and data transformations required by the attached peripheral devices, the spokesman explained.

The program can also monitor device status, provide status registers for the host processor, interrupt the host processor with data or status information and perform data channel transfers into and out of the host processor's memory, he added.

The unit costs $5,600. Teknekron is at 2118 Milvia St., Berkeley, Calif. 94704.

IPS Formatters Meet IBM, Ansi Standards

HOUSTON – The Model 1700 series IBM-standard and Ansi-standard magnetic tape formatters from Information Products Systems, Inc. (IPS) were designed for minicomputer-related applications.

The units feature external control to allow an external event to be synchronized to the data read/write operation; an interface signal is returned when a tape drive is up to speed and prepared to receive data, IPS noted.

Special circuits eliminate premature terminations when reading long phase-encoded data records, a spokesman added.

The formatters provide industry-compatible interfacing to controllers and tape transports from Bright, Pertec Computer Corp. and Wangco, the firm said, and up to eight dual density tape transports can be supported from one controller.

The Model 1703 dual-density/dual-speed formatter costs $3,150; the 1701 NRZI-only version costs $1,200; and the 1702 PE-only model costs $2,300.

IPS is at 6565 Rookin, Houston, Texas 77074.

DSD Has Diskette For DEC Systems

BERKELEY, Calif. – Data Systems Design, Inc. (DSD) has introduced the DSD 210 diskette memory system for use with the Digital Equipment Corp. PDP-8, PDP-11 and LSI-11.

The system is compatible with the DEC instruction set and the IBM 3740 format, DSD said.

Diskette formatting and write protect are standard, the vendor noted.

An 8-bit bipolar microprocessor controls all data transfers, monitors read/write head positionings and performs data error checks; a self-testing microcode performs verification tasks, according to a spokesman.

To enhance data reliability, the DSD 210 uses a digital phase-lock-loop data separation circuit.

The system with single, double or triple Shugart drives costs $2,795. DSD is at 1122 University Ave., Berkeley, Calif. 94702.

Travel Agents Get Turnkey

LEXINGTON, Mass. – A turnkey minicomputer for travel agents has been announced by Raytheon Co.

Designed for airline reservations and routine local office tasks, the Raytrav system allows the travel agent to work with a Passenger Airline Reservation System (Pars), receiving passenger itinerary and accounting data from the air carrier's host, while performing accounting, ticket printing, customer list maintenance, invoicing, sales analysis and accounts receivable and payable, the firm said.

The system will support up to 16 CRTs, each programmed in either the Pars or local mode, two 2.5M-byte disk cartridge drives and two printers.

A basic system based on the firm's PTS-1200 mini, four to six CRTs, 5M bytes of disk and one printer, including software, costs about $2,000/mo.

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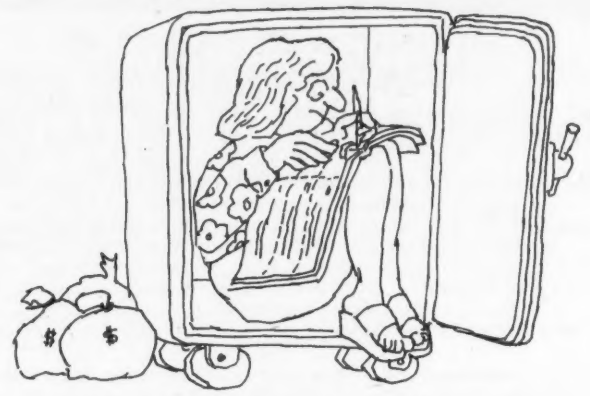

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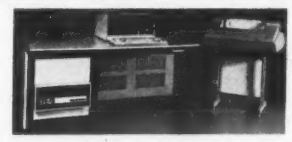

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Users Should Consider Options

David Saw Only Symptoms of Poor Mini Service

By S. Terry Woods
Special to Computerworld

As a representative of a company dedicated to service on minicomputers, I would have to agree for the most part with Jon David's article, "Mini Service Not Too Good" [CW, Oct. 4].

Service is the weak link in minicomputers, but turnover, lack of parts and little experience are the symptoms, not the actual problems.

Minicomputer Exchange

Three types of service are available – manufacturer, third-party maintenance company and independent specialist. Unfortunately the user rarely has a choice. The first two types are the only service available to 90% of the users in the field.

Manufacturers' maintenance is often ineffectual because these companies consider field service an expense to sales. It is only a selling tool; service answers to sales, so it rarely has an opportunity to develop into an efficient, creditable organization.

Field service in this case suffers from a lack of parts because the manufacturer will make money selling those parts in machines, but will make nothing if they are in a spares kit.

Ultimately these conditions breed frustration in service representatives who want to do a good job.

This frustration creates a second problem – high turnover – which in turn creates a third problem – lack of experience.

The second type of maintenance is supported by the manufacturer who does not want to spend money on field service and turns to a third-party maintenance company.

These companies, for the most part, provide the manufacturer with large numbers of strategically placed "warm bodies," while the manufacturer must provide the parts. Users again suffer because manufacturers do not want to take parts from the assembly line.

But there are numerous other problems with the third-party maintenance companies. Since their contracts are normally on a one-year basis, they cannot afford to spend much on training. Service representatives rarely get much experience on any one piece of equipment because the company takes on contracts for everything from typewriters to minicomputers to electric stoves.

This breeds frustration in the conscientious service people, which in turn encourages high turnover.

David has probably not been exposed to the third type of maintenance or he might have a more positive outlook on service.

Readers are urged to reply to this or any other Minicomputer Exchange article.

This is your column, a chance for you to exchange views on the various topics confronting the minicomputer user, a chance to tell the vendors what you are thinking and to let your fellow mini users know about pitfalls or new techniques in this area.

Letters or manuscripts should be addressed to Minicomputer Exchange, Computerworld, 797 Washington St., Newton, Mass. 02160. Double space, please.

When a company specializes in one system it takes full responsibility for all phases of maintenance. It purchases, controls and repairs its own parts, and since the service representatives specialize, they get ample training and experience and become confident of their ability.

This type of company is a service company run by service people. It rarely has a turnover problem because all problems are viewed with service in mind. This allows a person to acquire confidence, build a good reputation and avoid frustration.

Although this type of company appears to be the obvious solution to the maintenance problem, it is not very often available. In order for a company to survive specializing in one system there must be a heavy concentration of that system in a small geographic area. There are so many minicomputer manufacturers entering the field, there is rarely enough equipment concentration to make the investment feasible.

When purchasing a system most users look at software, hardware capabilities and cost. A longer look at available service might create more sophisticated and happier users.

Woods is president of Data Systems Support, Inc., a minicomputer service company in Woodland Hills, Calif.

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WANG

IBM User Needing Memory Hike Sidesteps Vendor's Requirement

CINCINNATI – When Whiting Manufacturing here found it needed more core memory on its IBM 3/15B – but not as much as the incremental amount dictated by the system's vendor – it turned to an independent memory manufacturer.

That "unique" combination of memory has since been replaced, according to William Boehm, controller for the manufacturer of comforters, draperies and pillows. While it lasted, however, it worked for the firm, he said.

Memory has since been expanded further because the company implemented additional on-line applications, he explained.

"We were [previously] capable of running one partition at 18K with full spooling support, but our other partition was only at 12K without spooling," Boehm recalled.

"We wanted to use the other partition for spool support and production and estimated we needed another 16K to 80K," he said. "But we couldn't cost-justify 96K and no vendor could supply us with anything but the normal increment until we called on CFI Memories, Inc."

Whiting would support the software side, but was concerned whether CFI would provide the hardware. CFI said it would.

By creating an 80K supervisor, Whiting was able to run all the software, spooling and the IBM utilities it was using. CFI in turn provided the add-on Mosfet memory and the system was expanded from 64K to 80K words of core memory.

"We did the supervisor work through the system console by means of an IBM utility that modifies disk pack data without mandatory regenerating of the system," Boehm said.

The result was a cost savings of about $65 a month. Before the add-on, the system had a 34K supervisor with spooling in only one partition, an 18K application partition and a 12K file maintenance and testing partition without spooling.

With the additional 16K, Whiting can offer 38K of supervisor with a 22K application partition for print and input spooling. There is also another 20K partition for production which is also fully supported for spooling, Boehm said.

Software programs for payroll, invoicing, order entry, sales analysis and production and inventory control were written in-house in RPG-II, with some Assembler subroutines.

"For anyone who is adept at modifying the supervisor, it's a simple change that makes an 80K or 112K machine quite viable," he added.

BST Has 20M Drives For IBM 3/8 Users

SANTA ANA, Calif. – Business Systems Technology, Inc. (BST) has a 20M-byte disk drive for the IBM 3/8.

The plug-compatible, direct-access drive is capable of increasing system capacity by more than eight times over standard IBM capacity, BST claimed.

A maximum of four BST drives can be attached to the 3/8 CPU, a spokesman noted.

The drive's average access time is 35 msec and the data transfer rate is 312 kbyte/sec, he said.

In order to run the larger drives of the 3/8, users must obtain 3/10 operating system software from IBM which does run on the 3/8, BST said. IBM will supply this software to its users, the spokesman added.

The first disk and controller cost $600/mo on a monthly rental plan or $500/mo on a one-year lease, BST said from 3015 Daimler St., Santa Ana, Calif. 92705.

Digitizer, PDP-11 Linked

FAIRFIELD, Conn. – Summagraphics Corp. has an interface to couple its Data Tablet/Digitizer with Digital Equipment Corp.'s PDP-11 minicomputers.

The interface, a single quad-width printed circuit board occupying one slot of the DEC Unibus, transfers X-Y coordinate information from the Summagraphics controller to the CPU and operates in either programmed I/O or interrupt mode, the firm said.

The interface with a 10-ft connecting cable costs $1,350 from Summagraphics at 35 Brentwood Ave., Fairfield, Conn. 06430.

House-Hunting System Saves Realtors' Time, Energy

By Esther Surden
Of the CW Staff

TUCSON, Ariz. – A minicomputer-based house-hunting system here is making life easier for real estate agents in this part of the country, according to Jerry Mitchell, executive director of Mylar Corp.

Mylar uses its Burroughs B1726 mini to provide a special kind of service to area real estate dealers, Mitchell said.

"We commissioned a professor from the University of Arizona to do a physiological profile on different houses. Then a videotape demonstration defines the individual's architectural preference," he said.

"Stacked up against what's available, the real estate broker then knows which properties to show the prospective buyer," he explained.

The brokers have TD 700 terminals in their offices. A 50-question preference test is given to the client and entered into the CRT.

Previously, employees had rated the houses according to the questions, "so all the mini has to do is make a search through the real estate listings to find out what would most suit his client," Mitchell said.

After the system makes its search, the prospective buyer is shown pictures of the selected homes. If the client is interested in any, the agent takes him to visit the site, he explained.

Savings Demonstrated

"We can demonstrate we are about 35% cheaper than most multiple listings and can save the broker about 65% in direct cost overhead," he claimed.

Mylar chose the minicomputer after talking with IBM, who in effect said "come back when you're big enough," Mitchell reported.

The Burroughs personnel became very interested in the firm's ideas and offered help in setting up the programs, he added.

Another reason the firm purchased the Burroughs system was the ability to upgrade from the bottom to the top of the line without reprogramming, Mitchell said.

The primary savings in using the system are a result of fewer wasted house visits; the client is shown only those homes that fit his needs. The system is nonbiased, so buyers won't be "upgraded" to a home that is more expensive than they can afford, Mitchell noted.

The firm sells the service for a one-time charge of $1,000 plus $225/mo and a percentage of the gross income from the system, Mitchell said.

The B1726 with 94K of memory, keypunch, disk and a line printer represents about $500,000 in research and development costs, he added.

Mini Eases Security Firms' Cost Accounting

LOS ALAMITOS, Calif. – Two sister companies here that design, manufacture and install security systems are using a minicomputer to conduct both cost-accounting and research operations in addition to selling time.

Protection Products, Inc., one of the two firms, manufactures and distributes security equipment to the alarm industry. This equipment is primarily designed for systems in homes and stores.

Pro Systems, Inc., the second firm, is a state-licensed contractor of sophisticated security installations for banks, government agencies and public utilities. Both firms share the same management, but operate independently.

A Hewlett-Packard (HP) Model 2000 Access computer was installed by Protection Products to manage inventory, according to John E. Harwick, president.

Perpetual Inventory

"As a wholesale distributor, we have more than 1,000 customers and 1,000 items of inventory. The computer conducts perpetual inventory, automatic invoice typing, payables and receivables," he said.

"Just keeping track of inventory and customers was enough to justify our purchase of a minicomputer. However, we felt that it would be possible to finance a larger computer like the HP 2000 Access by finding time-share customers to use the system," he continued.

"As a result, we had over $1,000 per month in revenues lined up even before the computer arrived – nearly half of the total cost. Since then, we have continued to add customers. We expect, very soon, that all payments for the computer will be made by others while we still retain half of the use."

Systems Experimentation

Pro Systems is now also using the 2000 and is experimenting with new DP-based security systems. To do this, the computer receives a series of inputs simulating the activities of a large building or utility, Harwick said.

Different software is then tested for effectiveness in directing security operations like monitoring alarms and controlling access to doors and vaults, he explained.

"We also expect in the near future to develop a complete computer-based building control system, one that will not only use the security software, but also monitor and control in real-time heating, air conditioning and lighting systems. Our in-house 2000 Access will be used to develop that hardware/software system," he said.

"With the money saved by our time-sharing service, we have been able to afford full-time personnel to develop these systems," he added.

Primary Clients

A large number of Pro Systems customers are colleges and universities. One of the primary reasons for the purchase of an HP computer was that a large number of schools already used HP systems for educational and business uses, according to Harwick.

"Our in-house designed security software will be compatible with their systems. It gives a university the opportunity to make maximum use of its computer's potential because security systems are needed most when the computer is usually used the least," he explained.

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Micro System Reduces Supermarket's Electric Bill

MINNEAPOLIS – A microcomputer-based energy management system has already saved a local supermarket here about 17% of its yearly electrical energy costs, according to the user.

The system installed at six Lund, Inc. supermarkets will reap the firm a projected savings of about $15,000/yr, Vice-President Vern Bockman predicted.

The decision to automate was made not only to save energy costs, but to allow the firm central control over the store's vital operations, Bockman said. However, management also wanted to give each of the stores local control, he said.

Other types of systems the firm considered, including an IBM System 7 minicomputer-based unit, would have been too expensive to install on a store-by-store basis and would have been insufficiently flexible if all six of the stores were to be tied together, he explained. So, the company chose an energy control system based on a stand-alone microcomputer, he said.

Based on the Micropac 180 system from Process Computer Systems, the system was developed by the Roy G. Letourneau Co. of Minneapolis.

It controls the operation and maintains the performance efficiency of refrigerators, freezers, the central heater, unit heaters, water heaters, air conditioners, ventilator fans and air curtain doors which control the passage of air of varying temperatures into and out of the 36,000 sq-ft building, he said.

Eventually, the store's lighting system will be brought under control of the system, especially during the summer season, Bockman indicated.

The increased illumination by the sun through the glass storefront permits a reduction in the use of artificial lighting, reducing the amount of heat which the air conditioners would have to expel from the premises, he explained.

Predetermined Power Level

The system hardware controls Lund's supermarket equipment in accordance with a predetermined maximum level of power demand based on the optimum use of the equipment, Bockman said.

Operating via I/O relays, it shuts off equipment during time intervals when their operation is unnecessary. In addition, the devices can be cycled to receive during their operation periods just enough current to enable them to maintain optimum performance levels, he stated.

The system automatically shuts down the air conditioning for the night. If the interior temperature of the store rises to 90°F during the night, the function override, sensing the thermostat has closed, will turn the air conditioning back on until the thermostat has reopened, Bockman explained.

Without this feature, the air conditioning would have to be left on throughout the night on the off-chance the temperature would reach an unacceptable level. The consequent wastage of power would be considerable, he noted.

During the cold season, the system automatically turns off Lund's central heating for the night. However, the user has set 55°F as his minimum acceptable overnight temperature.

Should the temperature drop below this level, the function override will turn the central heating back on until the temperature has risen again to the acceptable level.

Minicomputer Helps Alleviate Small Hospital's Growing Pains

BENTON, Ariz. – A minicomputer at Saline Memorial Hospital here is helping soothe growing pains prompted by the expansion of inpatient capacity by nearly 50%.

Saline Memorial is a 92-bed general-care facility with a staff of 16 physicians and surgeons and about 300 employees. A 44-bed extension is now nearing completion.

"We had our troubles little more than a year ago," according to E.F. Black Jr., assistant administrator of the hospital. "A ledger card posting system for patient records was increasingly inadequate in the face of rising patient and service volumes.

"We were having difficulty with tracking and applying ancillary patient service charges and keeping up with our receivables position and payables commitment; welfare and Medicare recordkeeping requirements were exploding," Black said.

"We also had no way to obtain the current, pertinent information needed for effective financial control and planning," he added.

Swift, Painless Conversion

Saline Memorial installed its first computer, an IBM System 32, in July 1975. Conversion from the old manual system was swift and painless, according to Peggy Hayre, manager of data processing.

To date, four of the five application programs included in the Hospital Financial Management System package have been implemented. These are patient billing, accounts receivable, accounts payable and general ledger.

The fifth application, payroll, is expected to be on the computer system soon, she said.

"The system automates the patient record and billing functions, cuts the paperwork load down to size and enables us to keep a tight rein on our receivables and payables situation," according to Black.

"The Hospital Financial Management Industry Application Program [IAP] pulls together and makes readily available information that is invaluable to our management. As a bonus, the system saves time and money in routine business operations," he said.

"The IAP performs all of the functions and provides the reports and management information a small hospital needs, and we felt we would be foolish not to take advantage of this," Hayre said.

"So far, the benefits to operations and management are impressive, with the major advantages, in my view, being derived from the patient billing and accounts receivable applications," she commented.

The patient billing system at Saline Memorial creates and maintains the patient record, applies room charges and triggers production of inpatient and outpatient transaction documents, admissions, discharges and transfers lists.

A daily census report by physician and within nursing stations is also prepared.

Ancillary service charges to the patient are collected with an IBM 5230 data collection system which serves the pharmacy, laboratory, radiology, respiratory therapy, surgery and central supply departments, Hayre explained.

"Patient billings produced on the computer now go out faster, thus speeding up our cash flow and reducing our clerical costs," Hayre said. "And the administrator and the controller get detail and summary reports on the number of services performed in each ancillary department, as well as the total charges.

"These are extremely helpful in analyzing service usage patterns and trends, establishing pricing levels and reviewing revenue sources," she noted.

The accounts receivable system maintains account records and furnishes automatic aging reports on a weekly basis.

Collection letters with appropriate overdue notices (30-, 60-, 90- and 120-day) are printed. Revenue reports and breakdowns of dollar amounts by department and classification (Medicare, Medicaid, welfare) within department are now available, Hayre stated.

Pertec Offering Formatted Drives

CHATSWORTH, Calif. – A series of OEM-formatted minicomputer tape drives incorporating a microformatter that eliminates separate interface hardware is available from Pertec Computer Corp.

The microformatter, using LSI/MSI and low-power Schottky TLL electronic components, offers both NRZI and phase-encoded tape formats on a single circuit board, according to the firm.

The drives include file search capability, space record commands and a crystal oscillator for timing. Up to three drives can be added in a master-slave configuration, Pertec said.

The drives are available as the models FT7000, FT8000 and FT9000. An internal circuit board eliminates the need for a separate formatter box and associated cabling usually required to interface a tape drive with a computer system.

The unit also eliminates the need for a separate formatter power supply by using the same supply as the tape transport, Pertec claimed.

The drives are available in 12.5- and 75 in./sec versions and 1,600- or 800 bit/in. storage density. Speed is switch-selectable, the firm said.

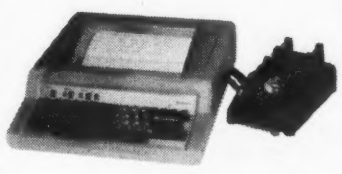
The formatted tape drives in read/write versions cost $3,275 for the FT7000, $4,195 for the FT8000 and $4,700 for the FT9000, Pertec said from 9600 Irondale Ave., Chatsworth, Calif. 91311.

Reader Links to DG Minis

DIAMOND BAR, Calif. – A portable paper tape reader system for Data General Corp. (DG) minicomputers is available from Data Syst.

The self-contained system includes a 300 char./sec reader, power supplies, interface and connecting cable for the DG systems.

The unit costs $495 from Data Syst at 23615 Decorah Road, Diamond Bar, Calif. 91765.



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IBM Market Share Never Fell Below 60%: McGovern

By Molly Upton
Of the CW Staff

LOS ANGELES – IBM's share of the general-purpose computer market never dropped below 60% from the 1960s through 1972, according to testimony admitted in the first week of California Computer Products, Inc.'s (Calcomp) antitrust trial against IBM.

Moving rapidly through readings of excerpted testimony and depositions of seven DP executives taken in the U.S. vs. IBM case, Calcomp attempted to establish the preponderance of IBM in these markets and the effect of its size upon other competitors.

On the seventh day of trial, the jury saw its first "live" witness, Patrick J. McGovern, chairman of International Data Corp., a market research firm whose statistics had previously been cited by each executive whose statements were read into evidence here.

McGovern indicated IBM's share in terms of monthly rental value of installed general-purpose systems with IBM processors in the U.S. ranged from 65% in 1964 to 68% in 1975, with a low of 63%. His definition of general-purpose machines excluded minicomputers.

Inroads made by plug-compatible manufacturers (PCM) into IBM's portion of the U.S. general-purpose market began in 1969, when they held a 1% share, he said.

This increased to 7% in 1973 and was at 8% in 1975.

McGovern attributed the greater PCM share during the later years to the use of independents' memory and printers as well as disk drives, tape drives and terminals. He illustrated his testimony by citing figures representing IBM's market share.

In 1969, for instance, IBM's share of the market for IBM systems with PCM equipment was 69%; when the value of attached PCM gear is excluded, however, that share drops to 65%, he said.

The figures were 69% and 67% respectively in 1970; 68% and 65% in 1971; and 67% and 63% in 1972, he said.

IBM's total system share jumped to 69% in 1973, but dropped to 62% for all-IBM systems. The figures were 68% and 62% in 1974 and 68% and 60% in 1975, he noted.

McGovern indicated IBM's share of the market for disk drives attachable to 360s and 370s reached a low point of 80% in 1975, or 75% if the 3340 is excluded.

At the end of 1971, the IBM share of the installed base of 2311s, 2314s, 2319s, 3330s and their equivalents was between 84% and 87%, he said.

New York Inclusions

Topics covered in readings from the New York antitrust case included executives' rankings of firms in the industry, considerations when they priced their products, the pros and cons of leasing equipment and why the market was oriented toward leasing.

The testimonies read in the three days following Calcomp's and IBM's opening arguments were from Robert E. McDonald, president of Sperry Rand; Edwin S. McCollister, who held posts at Burroughs, Univac and RCA; and John J. Hangen, NCR senior vice-president.

Others were Robert S. Oelman, chairman of NCR's executive committee; William C. Norris, chairman of Control Data Corp.; Anthony L. Conrad, president of RCA; and parts of testimony by Clarence Spangle, president of Honeywell Information Systems (HIS).

The executives' estimations of IBM's share of the general-purpose computer market ranged from 60% to 75% with the other mainframers' portions ranging from 2% to 10%.

Several indicated the industry was lease-oriented because customers preferred this and IBM offered leases; therefore, in order to be competitive, they were compelled to follow suit.

However, they said, leasing was a drain on their resources and in some cases limited their ability to conduct extensive research and development.

McDonald stated Univac was competitively disadvantaged by leasing since revenues were not realized until well after the initial installations.

However, he added, long-term leases were favorable because they tended to protect the installed base from IBM and gave a vendor a chance to realize more revenues over the long term than a sale.

McCollister said short-term leases expose one's base to the competition.

Hangen said NCR in 1967 had invested

(Continued on Page 50)

Mini Makers Unimpressed by Series/1

By Toni Wiseman
Of the CW Staff

IBM's recent announcement of the Series/1 [CW, Nov. 22] went off with more of a fizz than a bang, a survey of minicomputer manufacturers revealed.

Most were unimpressed with the new competition and did not expect adverse effects on their own market shares. One industry observer, in fact, commented that while the industry had geared itself for the onslaught of a tiger, it had been presented with a little kitten.

He noted, however, that kittens can grow up into tigers.

Dick Anderson, general manager of Hewlett-Packard's Data Systems Division, found the system "a little modest for where the state of the art is with the available technology in both hardware and software.

IBM Holding Back?

"You get the feeling IBM is holding back, that it's not that interested in making the minicomputer look too good compared to the large computer," he said.

The Series/1 had some features that were attractive, but also some surprises, Anderson said. Among the surprises was the lack of a discount policy, which he interpreted as meaning IBM does not intend to participate in the OEM market.

Anderson was also surprised the Series/1 does not offer any high-level languages. "I don't think a macro assembler will carry you very far, although it's hard to speculate what might still be in development," he said.

The Series/1 communications are, however, very attractive, he added, with the availability of asynchronous, bisynchronous and Synchronous Data Link Control protocols.

"My initial response is that we're not terribly worried by it," he said. "In many respects, it has a good news side to it in that it seems to me IBM participating in this marketplace is a recognition that distributed data processing and distributed computing are realities and here to stay," Anderson said.

David H. Methvin, president of Computer Automation, Inc., doesn't think the Series/1 will have any effect on his company, either positively or negatively.

"We don't see it as a competitor in our OEM business because it's such a very, very expensive piece of equipment," Methvin said.

"And on the upper end, in the end-user division, I don't see it as a threat to Syfa, which is a heavily software-oriented activity; that doesn't seem to be the kind of thing IBM is targeted on," he added.

While the IBM system is not causing him any headaches now, Methvin said it is impossible to tell what the giant might do three to four years down the road when it could very well change its tactics.

'Evolutionary Step'

Digital Equipment Corp. was also indifferent to the Series/1.

"As with previous small computer announcements, IBM's latest seems to be another evolutionary step in its development of small computer systems with its broad product range," a DEC spokesman said.

"This announcement is consistent wi the trends in computing which have been developing over the past 10 years. The IBM announcement has not tempered our expectations for continued growth and could possibly serve to expand markets for all major suppliers," he said.

'No Real Surprises'

Rowland H. Thomas, vice-president of product marketing for Data General, termed the announcement "very interesting.

"There were no real surprises in the announcement, based on the rumors we have been hearing for some time.

"We believe the announcement will stimulate demand for the computer industry in general and for the minicomputer industry in particular. As far as impact on use, we feel we have a strong and very broad product line and we will certainly get our share of that market expansion," Thomas said.

Jim Orris, vice-president of marketing for Varian Data Systems, expressed the opinion that "perhaps [IBM] is making a mistake coming out with a machine without software," particularly since "the key to the market it is going after is sophisticated software."

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Lear Puts ADM-3 In Kit Form

ANAHEIM, Calif. – Lear Siegler, Inc.'s Data Products Group is supplying its dumb ADM-3 CRT terminal as a kit to hobby stores with shipments running between 250 and 300 unit/mo and growing between 5% and 10% per month, according to Lee Falco, group general manager.

The decision to provide kits was made only hours after a computer store manager persuaded Falco there was a market, he said.

While Lear generally tries to maintain a low OEM profile, it is becoming known to end users through its kits, he said. However, Lear treats the kit sales to store owners as it would to OEMs, and all support and maintenance is provided by the stores.

Since the day in August when a store manager walked out with some incompleted units off the line, Lear has shipped over 1,000 terminals in kit form, he said.

To the end user, there is a real savings with kits if he's willing to put in the time, Falco said. An ADM-3 purchased from an OEM by an end user would cost as much as $1,500, but the kit price from store dealers ranges between $840 and $875, he noted.

Looking at the OEM terminal market, Falco admitted it is still very competitive. "I think it will continue to bottom out, forcing people into broader profit bases," he observed.

The price competition extends across the board into intelligent terminals as well as dumb terminals, he said. Large quantity OEM prices for dumb terminals are under $900.

Vertical Integration Profitable, Perilous

By Esther Surden
Of the CW Staff

SAN FRANCISCO – "Building your own peripherals can be a two-edged sword: It can increase your profit picture substantially and open new markets for you, but if you are not really prepared it can wind up costing you a lot more than your supplier's profit margin," according to Leonard S. Bleininger.

The company considering vertical integration should look at the "build-buy decision" and, if the cost to get into the business divided by the difference between purchase and cost to manufacture is less than the volume of expected sales, building may be the answer, Bleininger, vice-president for peripherals at Microdata Corp. told a group at a recent conference.

Start-up, tooling and facility costs are important to consider as well as the average cost of the total number of systems that will be built. Increases and decreases in the prices should be projected realistically, he said.

The projected volume requirement should include only those units the company expects to sell through including them in its own end-use systems, Bleininger stated. Any additional projections for OEM sales should not be added into the calculation.

If the company decides building is the way to go, it should be sure the total start-up and development times take as short an amount of time as possible.

Rapid obsolescence is characteristic of peripherals and a company that takes longer than necessary may find its new product obsolete in both performance and price, he said.

The decision of which of many devices to build is a difficult one, Bleininger indicated.

"Ask your marketing people which of these products will improve your company's overall reputation for technical excellence and which of these products would be more marketable to system builders," he continued.

Perhaps the purchasing department has had some problem procuring a product on time or at all; if so, the company could build that product, he said.

A company that has decided to buy its peripherals can choose from "multiple sources with only small performance/quality differences and even less difference in price," he warned.

"However, there is no alternative to a good relationship that you've had with a vendor for a long time," Bleininger advised. "If you are not fortunate enough to have a good relationship with a supplier, you must try to talk to people to whom he's currently supplying the product."

Companies to Consider

Two types of companies, the independent supplier and the peripheral supplier which also assembles its own system can be dealt with, Bleininger said. "There is a natural reluctance to purchase from the systems assembler since they may be a competitor in the marketplace.

"The fact is that with the increasing cost of developing today's more sophisticated peripherals, the independent supplier does not have the sales volume necessary to support the development effort.

"As the inevitable consequence, the independent supplier is disappearing and merging with system assemblers," he said.

The supplier's financial strength must be carefully considered as well, he added.

Contracts should include quantity discount price terms so that during the period of the contract the company is invoiced at a discounted price. However, if the firm buys less than its estimate, a retroactive adjustment will take place, Bleininger noted.

A condition should be written into the contract that stipulates if the supplier adjusts his going market price downward during the contract period, the company gets the benefit of the price reduction and "will not be required to pay a higher price if the adjustment is upward, he said.

Court Order Rules EMM Seizure Illegal

LOS ANGELES – The U.S. Court of Appeals for the Ninth Circuit here has ruled a 1972 U.S. Customs Service search of Electronic Memories & Magnetics Corp. (EMM) premises and seizure of documents violated the Fourth Amendment prohibition of unreasonable searches and seizures.

The order requires Customs to return all documents seized from the company under illegally obtained warrants.

The court's order, reversing a 1974 district court decision, related to a dispute pending since 1972 when Customs seized EMM's records and instituted proceedings which charged the company with undervaluing imports from its foreign assembly plants and sought a penalty for underpayment of customs duties.

In July 1975, Customs proposed to settle these proceedings for a mitigated penalty plus alleged loss of revenues totaling $2,841,239.

The company did not accept that proposal and has filed a supplemental petition for further reduction or remission of the penalty sought, which is still pending.

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Introduction Set Next Month

Software AG Planning TP Package Debut

By Toni Wiseman
Of the CW Staff

RESTON, Va. – With a new product on the horizon and a solid installed base of 200 users, Software AG feels confident about the future and the role it will play in the software industry.

The firm will be introducing a yet-to-be-named teleprocessing (TP) package in January which, according to John Maguire, president, is "unique" and combines the "best of the rest of the packages available."

Software AG's offering is a "combination of TSO, IMS/DC, CICS, Taskmaster, Shadow and others, but without the overhead," he said.

Many of the transaction-oriented packages currently available for on-line programming are inefficient in terms of human time, Maguire said, "and with the cost of labor going up this on-line programming capability is much more attractive.

"In fact it's so attractive that people pay a tremendous overhead penalty for having it," he added. "A typical TSO installation will take about one million bytes of core. That's a lot of money, but there are still a lot of installations out there."

For IBM Users Only

Software AG's typical TP installation will require some 180K bytes and will handle 50 to 60 terminals, with the core climbing to 300K as the number of terminals approaches 250, he said.

Written in Assembler, the soon-to-be-introduced product will run on any IBM processor but will not be available for non-IBM mainframes.

"IBM is 75% of the market and that's where most of your software products and companies gravitate. You have to make it economical," Maguire said.

"For five years we've been getting calls asking whether we're going to bring Adabas to Univac or Control Data Corp., and it isn't worth the effort.

"We'll go to the minis because then I'm looking at the 1980s and I see a million units out there, and then it's worthwhile. But it's not worthwhile trying to sell it to the 300 CDC 6000 series installations," he said.

Software AG has already begun converting its Adabas data base management system (DBMS) to minis, but it is not yet ready for release, Maguire said.

It is obvious that data base is the way of the future, he stated. It's taken six years for the market to reach the 30% saturation point, he noted, predicting that within the next 18 months 60% of the medium- to large-scale IBM CPUs will have a data base system.

"And that means most people in the data base system business will double their business in the next 18 months. We'll go from 200 to 400 Adabas installations," he said, adding Software AG currently has 6% to 7% of the installed DBMS base as opposed to nothing five years ago.

Software Industry Booming

The software industry itself is booming, Maguire said, estimating industry revenues should now be close to $600 million a year, growing 35% per year, up from $3 million in 1965.

The industry's growth is primarily a result of increased user buying, but also is a result of pricing.

"I've long believed software has been underpriced. A lot of companies went out of business because they weren't charging enough. They were pricing on costs rather than on value and if they made a slight mistake, they caught it financially," he said.

In keeping with his philosophy of pricing the package at its long-term worth, Software AG's TP package will sell for $60,000 initially; other packages on the market range from $15,000 to $58,000 for Cullinane's Shadow.

Maguire noted, however, that as soon as Software AG has established a user base, the price will increase to $90,000 or $100,000, "so I won't hurt any of the guys at the low end of the scale.

"This of course means we won't get all the users, just as we only have 6% or 7% with Adabase. But that's all right, I don't want them all."

"I just want to ensure that it's priced right to make it profitable and to allow for R&D and enhancements."

Xerox, Qume Settle

HAYWARD, Calif. – Xerox, its Diablo Systems subsidiary and Qume Corp. have settled their patent litigation on daisy-wheel impact printers.

Xerox had charged Qume and one of its founders with patent infringement and trade secret misuse. Qume countersued charging patent abuse and antitrust violation.

Under terms of the settlement, the litigation will be dismissed with neither party admitting liability. Xerox will receive a percentage royalty with an initial payment under one of the licenses.

In addition, both parties will enter into a broad cross-licensing agreement covering the manufacture and sale of daisy-wheel printers.

Both parties declined to discuss the details of the settlement, acknowledging only that each had agreed to bear its own costs in the litigation.

Small Disk Group Formed by Calcomp

ANAHEIM, Calif. – California Computer Products, Inc. (Calcomp) has formed a Small Disk Operations (SDO) group.

SDO, which has its own profit and loss responsibility, has assumed the company's floppy disk drive and formatter products as its initial product line.

The operation is staffed with personnel transferred from the company's existing line organizations and has its own production, engineering, quality assurance and marketing groups.

Certain functions such as sales, service and purchasing, however, will continue to be performed by centralized groups within the company.

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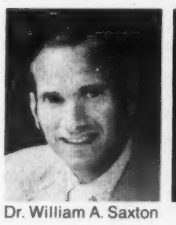
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2

IBM Share at Least 60%: McGovern

(Continued from Page 47)

heavily in offering its Model 315 on a rental basis; its inability to secure additional capital for leasing limited its number of Model 615 installations.

As an indication of the expense of capitalizing a lease base, Oelman said NCR has put $700 million in a rental pool since 1960. Between 90% and 95% of NCR systems are on lease, he said, adding "where users demand it, a company has no choice but to offer" leasing.

Price Competition

Several mainframers tended to price their products about 10% below IBM prices, the depositions indicated, although McCollister said RCA tried to offer more for the same price.

As an example of the other mainframers' positions, Calcomp lead attorney Max Blecher selected Spangle's statement that IBM could, theoretically, put Honeywell out of the DP business. This could occur, Spangle said, since IBM's profits are about 25% and HIS' total about 10%.

By effecting a drastic price reduction or by failing to raise prices when inflation drives production costs up, thus preventing others from raising their prices, IBM could cause a reduction in HIS profits, Spangle said.

The seriousness of such theoretical actions would depend on the length of time and the resources of Honeywell, Inc., Spangle's record stated. He said he had no indications IBM plans any such actions.

Competitors felt extreme pressures to announce products following IBM announcements, the depositions indicated. McCollister said RCA rushed into its announcement of the 70/45 eight months after IBM told the world about its forthcoming 360 series.

The executives also mentioned the time lag in following with equivalent products, such as those for IBM 2311 disk drives. McCollister said RCA purchased 2311s from IBM, which impacted its profitability since it paid list price.

Boies concentrated on internal weaknesses within various companies and certain admittedly poorly conceived machines.

The RCA series impacted the installed base of Spectras rather than attacking the IBM base, for example; this had a negative impact on RCA revenues since it was a lower priced machine, McCollister said.

At least six memories on the RCA 70/55 failed and had to be replaced. Only five 501s were made, McCollister said, because of manufacturing difficulties and also because of higher than estimated costs.

When questioning NCR witnesses, Boies attempted to point out that in measuring its installed general-purpose base, NCR excludes those CPUs which it categorizes as terminal systems, thus making its market share smaller than it might be.

Mini Maker Offering Micro

ANAHEIM, Calif. – With its GA/16 110-120 microcomputer, General Automation, Inc. (GA) can offer a packaged system at about 20% less than one with the SPC-16 mini, according to Thomas W. Dillman, manager of microcomputer product sales.

The savings are even more substantial when peripherals are excluded, he said. The price of a chassis using the micro is about 40% less than with the mini; on a board level, the price is about 90% less, he estimated.

Dillman expects the micro to replace the mini at the bottom end of GA's line. "It's a more cost-effective way to build a seven-year-old SPC-16," he said, adding it is a true 16-bit machine.

The specially designed micro offers two key advantages: inherent cost savings and support of GA's previously developed software, Dillman said.

Since the micro was designed to pattern the SPC-16, it handles all the software available for the older machine, he noted.

It can support up to 300M bytes of disk, 1,600 bit/in. tape drives and a variety of languages including Ansi Cobol, Fortran and Basic.

With the language availability, OEMs can get their product to market quickly since programmers in these languages are more widely available than those versed in Assembly, the principal language supported by several other micros, he said.

GA designed the micro to handle input/output rapidly, Dillman said. It has a direct memory access of 2.5M byte/sec without cycle stealing and its performance in handling the larger peripherals is as good or better than most SPC-16s, he said.

Currently most of GA's micro orders are for the customers wanting a packaged system, he said, and he expects this sector to continue to grow.

Once GA adopted the concept of turning out lower priced items in larger quantities, Dillman said, the firm had to do some reorganizing. He categorized the firm as one that had made pistachio ice cream, or specialized high-price systems such as those for Bank of America.

But Dillman's idea was to make vanilla and, he observed, one cannot extract vanilla from pistachio. But by orienting itself toward the larger production volumes of vanilla, GA could lower the production costs more and add the pistachio, or tailor systems once they were built.

Synertek supplies the microprocessors to GA, which owns one quarter of the outfit along with American Satellite Corp., Bulova watch and Unitrode, he said.

Expansions

Century Computer Corp., formerly of Dallas, Texas, and Walnut Creek, Calif., has moved to larger quarters at 2339 Stanwell Circle, Concord, Calif. 94520.

Informer, Inc. has moved its executive offices and plant to a 20,000 sq-ft facility at 8332 Osage Ave., Los Angeles.

Harris Corp. has authorized an expenditure of $7.5 million for construction of an integrated circuit plant adjacent to its Melbourne, Fla., facility.

Process Computer Systems, Inc., a manufacturer of industrial microcomputer systems, will move its operations from Flint, Mich., to a 24-acre site near Ann Arbor.

Universal Software, Inc. has opened a West Coast office at Suite 324, 3868 Carson St., Torrance, Calif. 90503.

Applied Digital Data Systems, Inc. has opened a 60,000 sq-ft addition to its headquarters plant in Hauppauge, N.Y.

Zentec Corp. has begun construction of a 35,000 sq-ft facility near the firm's headquarters in Santa Clara, Calif.

COM Service Bureau, Inc. of Boston has opened an office in Portland, Maine.

True Data Corp. has moved to new headquarters at 17092 Pullman St., Irvine, Calif.

Modular Devices, Inc. and its subsidiary, Modular Audio Products, have moved to new headquarters at 50 Orville Drive, Bohemia, N.Y. 11716.

Datapoint Corp. has leased 1,793 sq ft at 4440 Von Karman Ave., Newport Beach, Calif., and will open a sales office there.

Vercoe & Associates, a minicomputer business systems firm, has moved its headquarters to 4040 MacArthur Blvd., Newport Beach, Calif.

Digital Systems Corp. has opened its 20,000 sq-ft headquarters facility at 3 N. Main St., Walkersville, Md. 21793.

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French Firm Stressing Quality, Service to Gain Toehold in U.S.

By John P. Hebert
Of the CW Staff

LOS ANGELES – What does a French equipment manufacturer do to gain users in the U.S.?

It shows a dedication to quality and service, according to Richard L. Swarz, general manager of the U.S. division of Logabax S.A., headquartered here.

The first goal of Logabax' American division is to develop a good image of both the company and its products in the minds and eyes of the users, Swarz said.

"We plan to be here for a long time and to grow, so we must have an excellent reputation. We won't oversell or puff" our product line of printer terminals, he said.

Although its European counterpart is heavily targeted toward the OEM area, the U.S. division is primarily oriented toward the end user and OEMers second, he said. The response has been "superb" in the end-user marketplace, with solid foundations laid in California, notably at TRW, Inc. and Lockheed, he noted.

Changes in Users' Wants

Logabax has also seen changes in what users want since the American division's start-up in March 1975.

"Eighteen months ago, we saw a fascination with IBM's Synchronous Data Link Control (SDLC). Today we're in the process of quoting delivery on multicompatible devices – those are what the user wants," Swartz stated.

It is difficult to implement SDLC for interactive terminals, he claimed, adding if a terminal manufacturer doesn't have a migration capability, then it will "get shut off from possible users because the future impact of SDLC is so important.

"We are very happy that IBM moved to a matrix printing technique in interactive terminals, created an SDLC environment and that SDLC is not here in full force today – although we are very much prepared for SDLC," he said.

Users in Transition

The U.S. division is approaching users who are in a transition from the concept of slow printing and slow communications speeds to higher printing and transmission rates, according to Swarz.

"We are offering efficiency to a company through its employees and, because of this, there is more time available for employees to do other things.

"Logabax realizes most people pay for communications by time, through the cost of the communications itself and also through the personnel involved."

"We won't change in the future, in fact we will be going more in that direction," Swarz said, noting Logabax hopes to "provide a better tool for users to cope with an ever-growing demand for information on an interactive basis."

Logabax has whittled a niche in the U.S. with its 180 char./sec printers which are capable of synchronous and asynchronous communications at 1,200-, 2,400- and 4,800 bit/sec speeds, he said.

This area will continue to be the firm's bread-and-butter product line in the future, Swarz predicted.

Future Predictions

In the future, Swarz continued, Logabax plans to give the user more design capability to be able to react to input – something which hard-wired logic doesn't permit.

In addition, Swarz saw Logabax pioneering a part of the terminal market which is not yet popular – 1,200 bit/sec asynchronous communications at both 2,400- and 4,800 bit/sec rates.

The company now offers 300- and 1,200 bit/sec printing capability "because it provides a better tool for the user," he added.

The existing 300 bit/sec area, according to Swarz, is here already and 1,200 bit/sec capability is "just beginning to take off.

"We hope to see other major vendors in that area because it will create marketplace expansion," he said.

Logabax' latest terminal introduction, the LX1010, has "all the asynchronous protocols we are aware of today and all available synchronous protocols," he explained.

Swarz noted it is convenient for the user to have one machine rather than two terminals due to changes in communications protocols.

With the LX1010, he said, the user only needs a different program to allow communications with different computer equipment.

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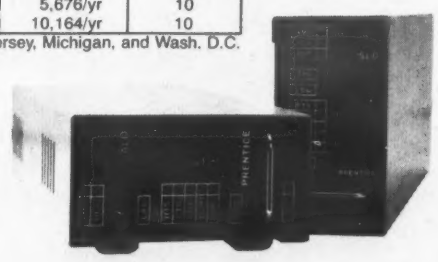

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Canadian DPers Told to Take Part In Drafting Privacy Protection Laws

TORONTO – Canadian DPers should participate in drafting legislation to protect privacy, Harvie Andre, a member of Parliament, told attendees at the annual meeting of the Association of Data Processing Service Organizations (Adapso).

Andre said he is very concerned about the lack of real public discussion on the proposed Canadian privacy law and has "very little faith" the bureaucratic decision will be good.

"I'm afraid it will be awful and put a burden on the industry," according to the former member of the management committee of the University of Calgary DP center.

Bill C72, which has been presented to the Cabinet for consideration, is designed to protect the individual's rights in all data banks except those the Cabinet feels might damage international relations or those which pertain to criminal records, he said.

Andre said he is concerned about the lack of legislation that interrelates the protection of privacy and the freedom of information.

He advocates removing the protection of privacy from C72 and making this issue the principal part of another bill.

"DPers should take the initiative and take their ideas to the government on how these issues should be attacked. Then it is more likely the law will be something that can be lived with," he said.

Andre, a member of Canada's Progressive Conservative party, decried the 600% increase in governmental DP expenditures over the last four years.

This rise, to $205 million in 1975, was in direct contradiction to government promises that it would seek to hold down spending in this area by awarding work to outside vendors, he said.

In the early 70s, 60% of the government's DP expenses were for in-house services. That figure is now 65%, he said.

Information Checklists Offered

WASHINGTON, D.C. – As an aid to those contemplating doing business in France, Belgium or the Netherlands, the U.S. Department of Commerce has published a series of reports on various aspects of the countries and their ways of doing business.

Information checklists detailing the reports are available by writing to Peter B. Field, country marketing manager, France/Benelux, Office of International Marketing, U.S. Department of Commerce, Washington, D.C. 20230.

Several reports on markets in France are available from the National Technical Information Service (Ntis) for $10 each.

These include: Computers & Related Equipment, DIB 76-07-502; Business Equipment & Systems, DIB 75-09-503; Communications Equipment & Systems, DIB 76-05-503. These can be ordered prepaid from Ntis, U.S. Department of Commerce, Springfield, Va. 22151.

International News

Foreign Orders & Installations

Amalgamated Quarries Ltd., based near Edinburgh, U.K., has installed a 2903 system from International Computers Ltd. to be used for invoicing, sales statistics, payroll and other accounting applications.

GEW-Werke, a public utility owned by the city of Cologne, West Germany, is installing a Univac 1100/12 system including more than 50 terminals to be used for customer and personnel information systems, warehouse and material accounting, payroll, financing, billing and energy calculations and forecasts.

The government of the Sudan has ordered a $19 million satellite communication system with a $10 million expansion option from Harris Corp. to consist of 14 earth stations and communication complexes.

Travis and Arnold Ltd., a British timber importer, has ordered a 2903 system from International Computers Ltd. to be used for sales ledger, sales analysis and invoicing.

Svenska Cellulosa AB has ordered a Measurex 2000 digital process control system for magazine production.

Delfin Rio S/A, Brazil's largest savings and loan association, has ordered Burroughs Corp. equipment including a B3700 system, 120 TU 1700 financial teller terminal systems, 60 TD 700 input and display systems and 60 DC 110 data communication controllers.

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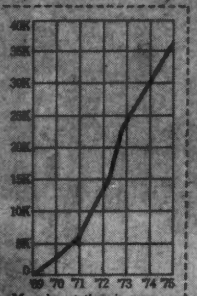

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Although Revenues at Record High

Sanders Year Earnings Take Steep Dive

By Ronald A. Frank
Of the CW Staff

NASHUA, N.H. – Although revenues for Sanders Associates, Inc. reached an all-time high in fiscal 1976, earnings took a steep dive, according to Harold Pope, chairman and chief executive officer.

Speaking at the Sanders annual meeting here recently, Pope said corporate revenues in the year ended July 30 rose to $198 million compared with $180 million in 1975.

But earnings plunged from almost $15 million in 1975 to $5.7 million in 1976, partly as a result of an "extraordinary tax credit" in 1975 of $2 million, according to M. Joel Kosheff, vice-president for finance.

Financial News

Revenues for Sanders Data Systems (SDS) increased to $28 million compared with $25.3 million in 1975. This resulted in a reduced operating loss at SDS of $6.1 million compared with $9.2 million in 1975.

SDS went into a "positive cash flow" in April of this year and fourth-quarter customer bookings for the firm's CRT line reached $9 million, according to M. Andrew Haladej, group vice-president.

Haladej reported good customer acceptance of the Sanders 8170 terminal series which, he said, provides users with better migration paths through software. The series has resulted in five new products, including the SDS 8180 replacement for IBM 3270 CRTs.

Sanders also recently introduced CRT replacements for Honeywell, Burroughs and Univac terminals.

IBM Case 'Proceeding'

Pope told stockholders the Sanders antitrust trial against IBM is "'moving along" and preparations "must be complete and thorough to challenge a force like IBM."

Up to now six million IBM documents have been examined in the discovery phase with 350,000 of these entered into a computerized data base.

Written depositions of IBM personnel will begin in January, with the trial now scheduled to begin at the start of 1979, Pope said.

"Litigating with IBM is very much like competing with IBM," attorney Joseph Millimet told the stockholders. Millimet is the lead attorney from the law firm of Millimet, Branch, Devine and Stahl, which is handling the suit for Sanders.

Asked by a stockholder how much Sanders is spending on the suit, Millimet said this information would be important to IBM and could not be divulged.

But Sanders has 25 staff members working with outside counsel on the case, he said.

The cases brought by California Computer Products and others against IBM "are substantially similar" to the Sanders suit, but in different product areas, and their outcome will have an effect on the SDS litigation, Millimet said.

"We are doing everything we can to advance the trial date," he said.

The fiscal 1976 sales of the Federal Systems Group rose to $164.8 million compared with $148.7 million in 1975. The Component Products Group had a drop in sales from $2.4 million in 1975 to $790,000 in 1976.

First-quarter operating results for fiscal 1977 will be released soon and will show an improvement over the comparable period last year, Pope reported.

DDI Revenues Gain

GREENWICH, Conn. – Data Dimensions, Inc. (DDI) reported revenues of $5.9 million for the nine months ended Sept. 30, an increase of 65% over comparable 1975 revenues of almost $3.6 million.

Income after provision for taxes, but before benefits from the application of tax-loss carryforward from prior years, increased 15% to $337,000 or 44 cents a share from $293,000 in the year-ago period.

Because of the availability of $50,000 in tax-loss carryforward in 1975, net income for the year-ago period was $343,000 or 44 cents a share.

For the third quarter, revenues were $2.1 million, an increase of 63% over revenues of $1.3 million in the 1975 quarter.

Third-quarter earnings were $117,000 or 16 cents a share compared with $114,000 or 15 cents a share in the year-ago period.

Data 100 Net Drops in Quarter

MINNETONKA, Minn. – Data 100 Corp.'s sales during the third quarter were better than in the comparable period a year ago, but the company's earnings fell below expectations, according to Edward D. Orenstein, president.

Earnings for the period totaled $1.15 million or 28 cents a share, including a $373,000 tax credit, compared with $1.85 million or 44 cents a share including a $780,000 tax credit in the year-ago quarter.

Revenues, however, rose to $30.2 million compared with $24.6 million in the same quarter last year.

For the nine months, earnings also dropped, to $3.5 million or 88 cents a share including an $858,000 tax credit, compared with $4.8 million or $1.18 a share with a $2 million tax credit in 1975.

Revenues for the nine-month period increased to $53.2 million compared with $38.3 million in the 1975 period.

Both third-quarter and nine-month results were significantly affected by foreign exchange losses amounting to $1.3 million in the nine months and $607,000 in the third quarter, Orenstein noted.

In the comparable periods in 1975, such losses were $317,000 and $319,000 respectively, he said.

Exchanges Rates at Fault

"The losses were primarily due to the deterioration in the exchange rates of the currencies in the UK and Ireland, where a substantial part of [Data 100's] overseas business is concentrated," he noted.

"Our current financial situation restricts us from taking many of the usual steps to hedge against foreign currency fluctuations, but we are exploring several methods of minimizing our exposure to these losses in the future," he added.

While Data 100 currently has a number of programs under way to strengthen its activities in product planning, engineering, customer service and marketing administration, "shortage of cash is still a major difficulty and is currently restricting the company's growth," Orenstein said.

"The market is such that we can sell or lease everything we build, but capital constraints have kept us from building enough products to sustain desirable growth," he concluded.

Nickels & Dimes

Control Data, as a result of substantially reduced credit requirements, has arranged a new $100 million domestic revolving credit agreement to replace a $165 million line due to expire on Jan. 1, 1978.

The new credit line, arranged with a group of 25 banks led by Chase Manhattan, will terminate Jan. 1, 1979.

$ $ $

Western Union International has declared a quarterly dividend of 20 cents payable Dec. 13 to holders of record Nov. 29.

Sycor has filed an application to list its common stock for trading on the New York Stock Exchange. The company's common stock is presently traded on the over-the-counter market.

$ $ $

Burroughs has declared a 17-cent dividend payable Feb. 7 to holders of record Jan. 7.

$ $ $

Digital Equipment Corp. shareholders have approved a three-for-one stock split, increasing the authorized capital stock from 36 million to 50 million shares.

Data Card has declared a 3-cent dividend payable Dec. 8 to holders of record Nov. 26.

$ $ $

Datronic Rental will offer to all debenture holders of the company to purchase for cash up to $492,000 principal amount of its 7% convertible subordinated debentures due March 15, 1984.

$ $ $

Honeywell has declared a dividend of 40 cents payable Dec. 13 to holders of record Nov. 26.

New Registrations

GRAPHIC SCANNING CORP., 99 W. Sheffield Ave., Englewood, N.J. 07631, a computer service firm, filed to register 75,000 shares of common, to be offered for sale by D.H. Blair Securities Corp. at prevailing prices in the over-the-counter market at the time of sale.

MRI SYSTEMS CORP., 12675 Research Blvd., Austin, Texas 78766, a software products firm, filed to register up to 1,336,589 shares of common. The registration statement covers the merger of MRI Systems Corp., a Texas corporation, into a newly formed Delaware corporation with the same name. No underwriter is involved.

ITEL CORP., One Embarcadero Center, San Francisco, Calif. 94111, a data services firm, filed to register 2,107,128 shares of common to be issued in connection with the acquisition of Autex, Inc., and Computer Dimensions, Inc. No underwriter is involved.

INSTITUTE FOR SCIENTIFIC INFORMATION, INC., 325 Chestnut St., Philadelphia, Pa., a publications firm, filed to register 330,708 shares of common, to be offered for sale through underwriters headed by Fahnstock & Co., 110 Wall St., New York, N.Y. Of these, 100,000 will be sold by the company and 230,708 by certain selling shareholders.

COMSHARE, INC., 3001 S. State St., Ann Arbor, Mich. 48106, a remote processing firm, filed to register 122,500 shares of common, to be offered for issuance in a proposed merger of Trilog Associates, Inc. of Philadelphia into Comshare. No underwriter is involved.

MOHAWK DATA SCIENCES CORP., 1599 Littleton Road, Parsippany, N.J. 07054, a data entry firm, filed to register 400,000 shares of common, issuable upon the exercise of the company's common stock purchase warrants presently held by Source Capital, Inc. Allen & Co. Inc., 30 Broad St., New York, N.Y. 10004 will be the managing underwriter.

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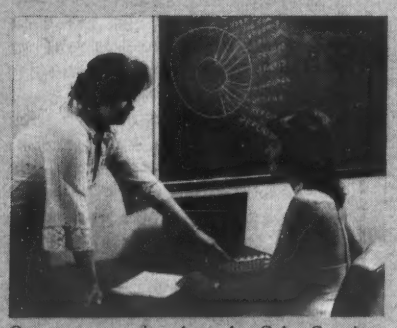

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Pertec Targets Both Ends of Peripherals Spectrum

By Toni Wiseman
Of the CW Staff

CHATSWORTH, Calif. – The 32-bit "super minis" which have appeared on the market in the past two years have been benchmarked against machines up to the IBM 370/138 in terms of performance, but with greater improvement in price/performance, according to the president of Pertec Computer Corp.

As a result, companies like Pertec are anticipating the need for higher performance peripherals, Ralph Gabai said, and 50M-, 100M- and 200M-byte disks are becoming common.

At the other end of the spectrum, micros are finding application in all areas; this means a need for more peripherals, price-compatible with the micros which can be acquired for $250, Gabai said.

Therefore, Pertec and the newly acquired Icom are addressing both segments of the market, he said.

There are two totally different strategies for the peripherals the user wants, Gabai noted.

Electromechanical peripherals are highly labor sensitive; semiconductor technology is not. On the other hand, semiconductor technology requires a high front-end investment, he explained.

The price/performance ratio has been improving dramatically in this area, he added, but it is much more difficult to be price-compatible with micros than with minis.

All three Pertec product lines have been strong in the past year, Gabai said.

"There has been a higher growth rate in flexible disks and in cartridge disks. And the tape rate of growth is faster than the growth rate of the total marketplace," he said, noting "we're seeing the effect of several manufacturers who are not making it."

Gabai estimated tape would grow at a 5% to 10% compounded rate until 1980, with the higher performance equipment growing more as the low end starts to fall off.

Both rigid and flexible disks, on the other hand, should grow at a compound rate of 30% to 35%, he judged.

Disks will be going through their greatest cost/performance improvement now and during the next two years, he said.

Floppies vs. Tape

Disk sales are becoming much more significant, he said. Two years ago tape accounted for 90% of sales and disks for 10%; today, the ratio has shifted to 60%-40%, he said.

But, he added, that 60% is substantially higher than the 90% was in terms of quantity.

A year from now the ratio will probably be closer to 50%-50%, he predicted.

"There is no question the growth rate in disk will be much higher than tape, that disk will swamp out tape over the next two to three years," he said.

"But from Pertec's vantage point, tape will always be a major chunk of our revenues. There are always applications where tape will be viable, such as a hierarchy of tape technology backing up disk."

COMPUTER MANAGEMENT
United Kingdom

World rank as DP market: *Fourth*
1975 DP expenditures: *$2.7 Billion*
1975 imports from US: *$270 Million*
Rank as importer from US: *Third*

Computer Management is a monthly magazine recently purchased by Computerworld, Inc. Monthly circulation is 30,000.

COMPUTERWOCHE
Germany

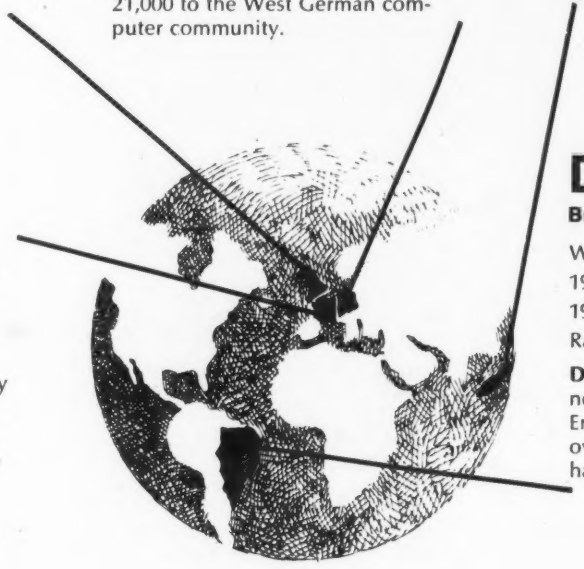
World rank as DP market: *Third*
1975 DP expenditures: *$3.7 Billion*
1975 imports from US: *$274 Million*
Rank as importer from US: *Second*

Computerwoche is a weekly tabloid newspaper started by Computerworld, Inc. It has a circulation of 21,000 to the West German computer community.

SHUKAN COMPUTER
Japan

World rank as DP market: *Second*
1975 DP expenditures: *$4.6 Billion*
1975 imports from US: *$189 Million*
Rank as importer from US: *Fifth*

Shukan is a weekly tabloid newspaper, jointly owned by Computerworld and Dempa publications. Circulation is 35,000.



Zero-Un Informatique
France

World rank as DP market: *Fifth*
1975 DP expenditures: *$2.5 Billion*
1975 imports from US: *$223 Million*
Rank as importer from US: *Fourth*

Computerworld represents **Zero-Un Informatique** in the U S Zero-Un has three publications, one a weekly tabloid newspaper with circulation of 22,000, the second a monthly magazine, circulating 13,000 copies, and a new bi-weekly, Minis and Micros. All circulate throughout Europe's French speaking computer market.

DATANEWS
Brazil

World rank as DP market: *12th*
1975 DP expenditures: *$250 Million*
1975 imports from US: *$60 Million*
Rank as importer from US: *(Est) 10th*

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COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Executive Corner

■ Seymour Naps has been appointed vice-president of Compuscan, Inc.

■ Donald J.D. Connolly has been named group vice-president of sales; C. Patrick Houston, director of marketing; and Bert P. Headden treasurer of Carterfone Communications Corp.

■ Frank J. Cummisky and Kasper V. Cassani have been elected vice-presidents of IBM Corp.

■ John T. Hartley Jr. has been elected executive vice-president and Michael F. Maguire has been elected vice-president/group executive of Harris Corp.

■ Daniel M. Ulrey has been appointed vice-president of marketing and William G. Brunswick has joined Computer Research Co. as vice-president of development.

■ William A. Wells has been promoted to vice-president of international sales at Business Systems Technology, Inc.

■ Robert L. Sikora has been appointed senior vice-president of finance at California Computer Products, Inc. (Calcomp).

■ Robert B. McFarland has been appointed a vice-president of Dataproducts Corp.

■ Nicholas W. Cardell has been appointed vice-president and general manager of international marketing for Bunker Ramo Corp.'s Information System Division.

■ Hal G. Smith has been appointed vice-president of bank software development; Nestor M. de Armas, vice-president of finance; and Donald L. Parsons, vice-president of data services for Florida Software Services, Inc.

'76 Sales Reach $110 Million

Low Profile Not Hurting SDC Revenues

By Toni Wiseman
Of the CW Staff

SANTA MONICA, Calif. – Systems Development Corp. (SDC) has always been a very conservative company, an image it still tries to project with a low advertising profile, several of the company's executives said recently.

Despite low-gear promotion, SDC had sales of $110.5 million for 1976, up from $108.6 million last year and more than double its 1972 sales of $51.1 million, according to M.J. Sargeant, manager of the Advanced Systems Department of the Research and Development Division.

SDC is predicting sales of $120 million for fiscal 1977, he noted.

The firm evolved as a spin-off from Rand, first as a nonprofit organization in 1956 and then as a for-profit company in 1969. SDC currently consists of four divisions – government systems; R&D; SDC Development Corp., which has its own subsidiaries; and SDC International.

The company also has two wholly owned subsidiaries – Mechanics Research, Inc. and Integrated Systems Support, Inc., a facilities management company.

Along with facilities management software and programming, SDC has expertise in the areas of turnkey systems, system/product design, training, simulation and operations research, Sargeant said.

In the business system area, SDC has ventured into financial data systems; command, control and communications; intelligence and surveillance; meteorological and geodetic systems; and energy and environment systems as well as text-editing and composition, education, search and transportation systems, he noted.

In the electronic funds transfer (EFT) area, SDC has a contract from the Savings Association Central Corp. (Sacc) of California, an association of savings and loan (S&L) associations, to develop an EFT system. Sacc is currently made up of 92 of the 172 California S&Ls, with more expected to join later, Sargeant said.

SDC has contracted to build a centralized dual-processor system for automatic transaction processing. System capabilities, according to Sargeant, will include transaction routing, audit trail creation, security control, interinstitutional settlement and terminal control.

The system will also support check authorization and off-line backup processing for participating institutions.

SDC, as it does under many of its contracts, will retain marketing rights for the system, allowing it to market the system to other states or regions. Customization would be necessary in each individual case, Sargeant noted.

"The field is wide open," he added. "EFT is a major business area for SDC. Our market share should grow to be bigger than for Text II."

Newspaper Mart 'Tremendous'

Text II, another product area for SDC, is prepared by the Electronic Publishing Systems Division. It is a computerized text-processing system which includes modules to handle not only the production cycle of a publishing firm, but also billing, accounts receivable, cash posting and management reports.

As in the case of SDC's EFT system, the user owns the hardware for Text II while SDC retains the rights to the software.

"The market for these systems is tremendous," Dale Blackwell, manager, said. "There are 1,400 papers that publish daily in the U.S. and, although we are only marketing to those with circulations of 20,000 or more, there is a wide area of opportunity.

"We're selling in the top circulation group now, but we are also getting requests from smaller papers. Our competitors have structured their marketing to satisfy the needs of these smaller users and we will also have to eventually," Blackwell said.

This could be accomplished by leaving off some of the "bells and whistles," he said, preparing a system with fewer capabilities or developing a system with only one CPU instead of the duplex system Text II uses.

Blackwell said that while the market in the U.S. will continue to be sufficient for a number of years, when it tapers off SDC will address the European market. In fact, the firm has already demonstrated the system to a paper in Helsinki, he noted.

Retrofitting is becoming a major part of the division's business, he said, upgrading systems both in terms of hardware and software.

SDC's major competition in the text-editing area comes from hardware manufacturers such as Digital Equipment, Harris and Autologic, he said.

"We have a reputation for being the best, but also for being the most expensive, and we're going to do something about that," Blackwell said. "We'd like to become more competitive."

Contracts

Collins Commercial Telecommunications Division of Rockwell International's Electronic Operations has been awarded a $13.5 million contract to supply computer-controlled switching equipment to ITT Corp. Communications Services, Inc.

System Development Corp. has received a $13.2 million contract to design, develop and maintain a telemetry DP system at Vandenberg Air Force Base from the Air Force's Space and Missile Test Center. The contract covers a period of five years and contains options for three one-year extensions.

Raytheon Co. has been awarded an $11.2 million contract for the Direct Access Radar Channel system by the Federal Aviation Administration.

Qume Corp. has received a $5 million contract from Anderson Jacobson, Inc. for 6,000 Qume electronic character printers.

The Westlands Bank in Santa Ana, Calif., has extended its facilities management agreement with National Sharedata Corp. at a cost of $5 million over a five-year renewal term.

Control Data Corp. has received a $6.8 million contract from the Raytheon Co. to supply computers for the Pave Paws phased-array radar.

3M's Industrial Graphics Division has entered into an OEM agreement with Logetronics, Inc. for 3M XL negative projection printing plates and processor.

Shugart Associates has signed a $3 million OEM contract with Wang Laboratories. The pact calls for deliveries of Shugart SA800 standard floppy disk drives and SA400 minifloppy drives over the next three years.

Dataproducts Corp. has signed an agreement with Astronautics Corp. to develop a line printer for use in secure government DP and message applications.

Applied Digital Data Systems, Inc. has signed a $1 million contract to supply Display Data Corp. with 1,000 CRTs.

CMC Division of Pertec Computer Corp. has been awarded an $840,000 contract from the Army's Computer Systems Support and Evaluation Agency. Under this agreement, CMC 1800 Keyprocessing systems will be chosen when a system with 16 or more keystations is needed by Army data entry installations within the U.S.

Kennedy Co. has received two contracts in excess of $220,000 for Model 330 single-transport cartridge recorders from Ohio Nuclear, Inc. and for Model 9000 tape transports from Motorola, Inc.

AT&T has renewed its contract with Leasametric, a division of Metric Resources Corp., for one year. The agreement grants discounts to all Bell Telephone companies on monthly rentals of testing instruments.

The System Monitoring Division of Rockwell International's Autonetics Group has been awarded a $3 million contract from Wisconsin Power & Light for a computer-based system to monitor and control electric and gas power.

Dataproducts Corp. has been awarded a $2.5 million contract by Univac for core memory systems. The memories will be used in the Automated Radar Terminal System for the Federal Aviation Administration.

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To qualify, you must be able to provide: Hardware/software technical support in real-time, on-line communications oriented systems. "Hands-on" experience with minicomputers, integration of hardware and equipment operations. Designing, evaluation, implementation and maintenance of data communications software, evaluation, selection and installation of computer hardware.

If you want to be considered for this position, send your resume, with background, and salary history, in confidence, to:

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SUPPORTING ON-LINE FINANCIAL SERVICES

Computer Sharing Services, a wholly owned subsidiary of Rio Grande Industries, is a leader in the information processing industry. Expansion of our financial services division provides an excellent opportunity for advancement.

FINANCIAL APPLICATIONS PROGRAMMER

Your background must include 2-3 years experience with a savings and loan or commercial bank, designing, coding and implementing financial applications. A working knowledge of the following software would be a definite plus:
Citizens Savings & Loan - 'IT' Software
MSA - FICS Software

ON-LINE SYSTEMS PROGRAMMER

We are seeking an individual experienced with BTAM and on-line teleprocessing monitors. Responsibilities would include writing new financial application overlays and maintaining the TP software.

CSS offers an excellent salary and benefit program. Send resume and salary history in confidence to:

Mr. Peter L. Wise
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NEW POSITIONS IN SAN DIEGO

The Special Systems Division of NCR located in San Diego, is involved in the development of on-line banking and retail systems. Current and future business commitments require that we add several systems analysts in the following categories:

Communications Software Development

These positions entail the system design and development of software for large communications networks. Experience at all levels in assembly language and a mini-computer background is necessary. Experience in telecommunications, software and a related BS degree is preferred.

Software Support

Requires persons skilled in assembly language, with a sound background in mini-computers to perform maintenance and field support of telecommunications networks. A number of these positions provide the opportunity for substantial travel and customer contact.

Computer Systems Simulation

A position exists for a person with a minimum of two years' experience to perform simulation of computer systems and compiler performance measurement. This position requires knowledge of statistics and queuing theory and programming experience in languages such as Fortran, GPSS or Simscript. A related degree is preferred.

Please submit resume including salary history to Manager, Industrial Relations.

NCR
Special Systems Division
4045 Sorrento Valley Blvd.
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Our continued growth requires AFS to increase our systems and programming staff at both senior and less senior levels. Our requirements include a minimum of two years COBOL experience. Since we are basically hardware independent, large or medium scale main frame, or mini-computer experience is desirable. Experience in banking applications is also desirable, particularly for senior candidates.

Benefits and working conditions are excellent. Salaries are open depending upon qualifications.

To explore these growth opportunities, kindly send complete resume to:

Mr. Tom Stigliano
Director, Technical Services
AUTOMATED FINANCIAL SYSTEMS, INC., (AFS)
1016 King of Prussia Business Center
King of Prussia, PA 19406
(215) 337-3200

SWEDA

PROGRAMMERS

SWEDA International, a leading manufacturer of electronic cash registers and minicomputer based point-of-sale systems, is expanding their product development programming staff.

Candidates must possess a demonstrable facility in assembly languages with experience in any of the following areas an advantage:

- NOVA 1200 (or any bit mini) assembly language
- Conditional assembly and macros
- DGC MACRO assembler
- Point-of-sale systems
- Real-time interpretive languages
- Computer program specification development

We offer a permanent growth opportunity with fine salaries and benefits. Please send resume including salary history and requirements in confidence to: MR. L.C. GOETTING, Manager Professional Development.

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Systems Programmer
Montgomery County Gov't
100 Maryland Ave.
Personnel Office, Room 330
Rockville, Maryland 20850
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Duties include assisting faculty and students with instructional computing problems, improving library programs and documentation, and conducting user seminars. Preferred background includes master's degree; advanced knowledge of two of the following languages: Fortran, PL/I, Cobol, and Assembly; experience with a statistical package such as SPSS; previous academic computing experience; and familiarity with IBM 360/370 computers. Send resume, references and salary requirements to Marian Frobish, Computer Center Director, Holmes Hall, Bradley University, Peoria, Ill. 61625.

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Manufacturing company in SW Ohio has opening for person with background of programmer/analyst and experience in 2 or more of —

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32 W. Randolph St.
Chicago, IL 60601
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TERMINAL SYSTEMS DIVISION
CAMBRIDGE., OHIO

SR. SOFTWARE ANALYST
FOR
SIMULATION MODELS

To design and develop simulation models of retail Point-of-Sale terminal systems including the interpretation of the system hardware, software, and utilization requirements as they relate to design, development, validation and application of models. Will perform desk top analysis to obtain information required for validation of simulation models. 3-5 years experience with micro/mini processor systems and communication network with at least a year's work with GPSS. An appropriate degree will round out your qualifications.

SENIOR SOFTWARE ANALYST

To contribute significantly to the investigation of future software systems for retail Point-of-Sale products/systems. This individual will bring a rather broad academic and experience background in computer system software design for a variety of computer architectures. Will also be involved in projects whose objectives will be to reduce the risk of computer technologies which are candidates for implementation in our next major P.O.S. product development cycle.

An MS degree plus some rather broad experience with computer system providing high visibility and growth.

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Robert W. Donovan
Terminal Systems Division - Cambridge
NCR Corporation
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To $25,000
MVS Systems/Programmer
To $25,000
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To $19,500
Financial Programmer/Analyst
To $19,000
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To $18,000

Please submit resume and salary history in confidence to:
J. Peter Marshall Assoc.
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$18,000.

Our organization, a leader in its field, seeks a creative, Systems Analyst/Programmer to assist in development and implementation of an NCR on-line major system. The specific system consists of duo-programming 256K-NCR-151 on-line, with 128K back-up. In addition, you should be well-versed in NEAT/3 levels 1 & 2, and possess knowledge of Cobol programming. Excellent growth potential and company-paid benefit package. Apply in person to Director of Personnel, or submit detailed resume in complete confidence to

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Systems Analysts & Programmers-1-5 years experience with any or all of the following languages; COBOL, FORTRAN, PL1 and Assembler. You should be familiar with Data Base systems.

NC Programmer-1-3 years experience in NC programming with experience in APT.

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Ronald H. Like
Mgr., Prof. Employment
(309) 792-4993

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This position requires a data management professional with at least five years of experience in management of an on-line, disc-drive data processing center in support of a complex organization and a degree in data management, computer science, business administration, or related field. In addition, extensive knowledge of data processing applications to financial, personnel, scheduling, etc. user needs is required. An advanced degree and experience in teleprocessing is desired.

Resumes should be submitted by December 20.

CONTACT: R. G. SNYDER
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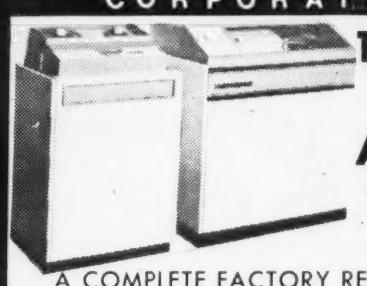

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RPQ F27105		Stop Code: to =
IBM 2848 Display Control Model 003-Operation of 2260's Model 1 with up to 960 characters per station.	2	
F/C 3357	4 each	Display Adapters
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5340		Non-Destructive Cursor
5341		Non-Destructive Cursor Adapter
7928		1053 Adapter
IBM 1053 Printer Model 004-for attachment to 2845 or 2848 display control.	4	
IBM 2260 Display Stations Model 001-for a 2848 Model 3 with appropriate display Adapter.	11	
F/C 3606		Extended Cursor Control
		Keyboard Alphameric
IBM 2260 Display Stations Model 001-for 2848 Model 3 with appropriate display Adapter.	16	
F/C 4766		Alphameric Keyboard
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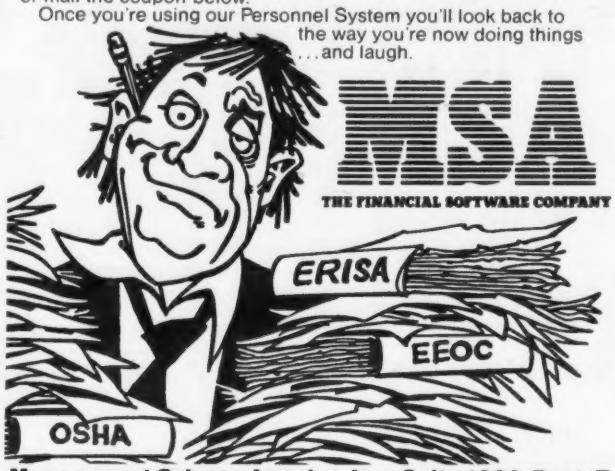

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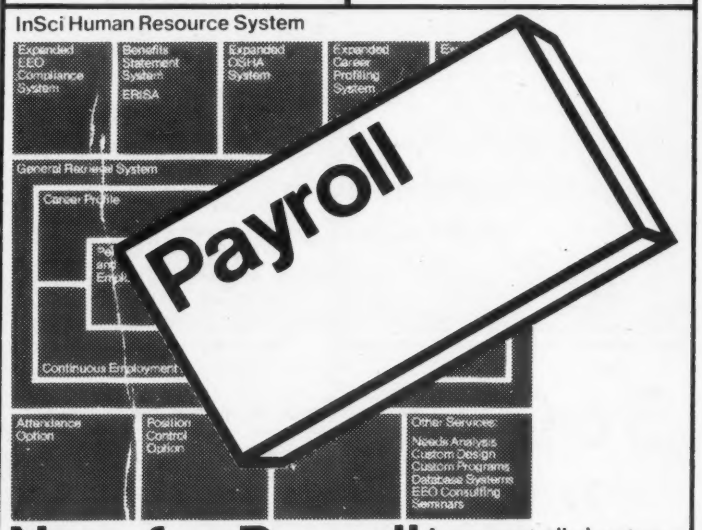

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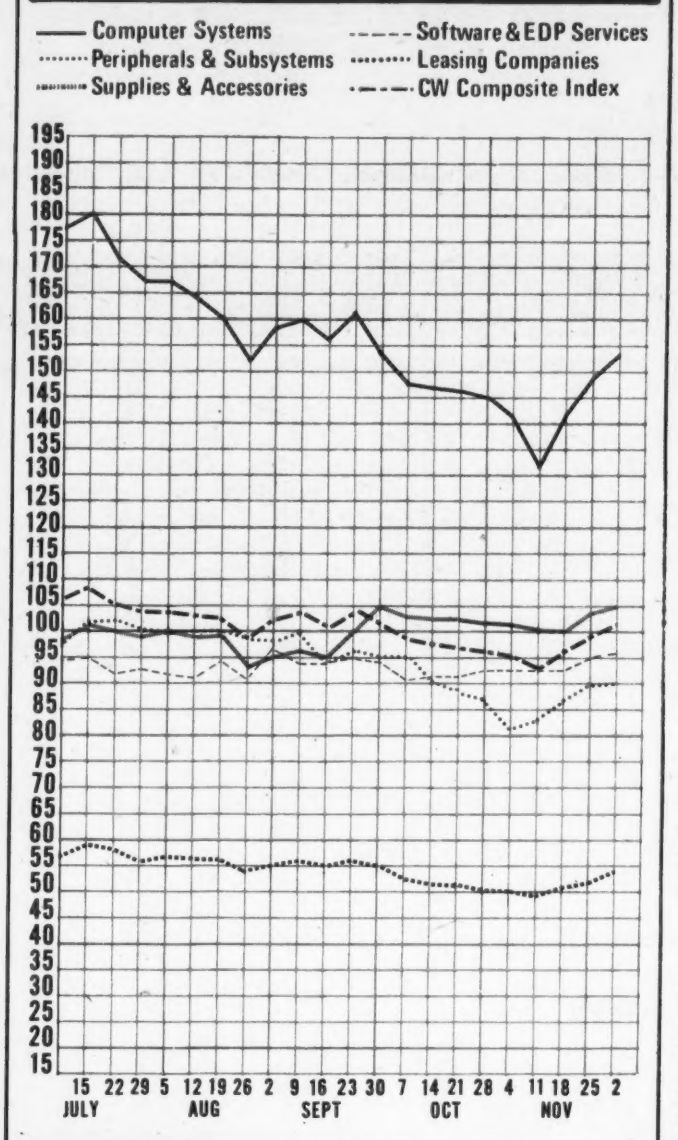
COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

TEKTRONIX
Three Months Ended Aug. 21

	1976	1975
Shr Ernd	$.96	$.66
Revenue	89,543,000	74,858,000
Earnings	8,419,000	5,760,000

CONTROL DATA
Three Months Ended Sept. 30

	1976	a1975
Shr Ernd	$.87	$.53
Revenue	329,084,000	310,224,000
Tax Cred	350,000	100,000
Earnings	14,997,000	9,225,000
9 Mo Shr	2.12	1.73
Revenue	970,782,000	891,604,000
Tax Cred	600,000	300,000
Earnings	36,684,000	29,364,000

a-Restated.

CRAY RESEARCH
Three Months Ended Sept. 30

	1976	a1975
Loss	$415,000	.....
9 Mo Loss	995,000	.....

a-Company went public March 17, 1976.

DATA GENERAL
Year Ended Sept. 25

	1976	1975
Shr Ernd	$1.98	$1.51
Revenue	161,117,000	108,222,000
Earnings	18,948,000	12,851,000

FOUR-PHASE SYSTEMS
Three Months Ended Sept. 30

	1976	1975
Shr Ernd	$.57	$.66
Revenue	16,023,803	12,769,886
Tax Cred	945,000	281,000
Earnings	2,146,085	758,582
9 Mo Shr	2.46	1.24
Revenue	45,751,037	36,434,681
Tax Cred	2,281,000	579,000
Earnings	5,370,648	1,556,523

GENERAL INSTRUMENT
Three Months Ended Aug. 29

	1976	a1975
Shr Ernd	$.62	b$.40
Revenue	117,040,704	93,727,428
Disc Op	.....	(638,000)
Earnings	4,930,436	3,322,064
6 Mo Shr	1.01	b.50
Revenue	224,238,987	180,177,027
Disc Op	.....	(1,089,000)
Earnings	8,146,844	4,413,165

a-Restated. b-Adjusted for 2% stock dividend in May 1976.

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TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DECEMBER 1, 1976

All statistics compiled, computed and formatted by TRADE*QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		1976 RANGE (1)	CLOSE DEC 1 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	23- 30	28	+ 3/8	+1.3
N	BURROUGHS CORP	84-108	90 3/8	- 7/8	-0.9
O	COMPUTER AUTOMATION	10- 19	16 1/4	- 1/2	-2.9
N	CONTROL DATA CORP	18- 27	22 7/8	- 1/4	-1.0
N	DATA GENERAL CORP	40- 60	47 1/2	+ 3/4	+1.6
O	DATAPOINT CORP	24- 46	30 1/2	+2	+7.0
O	DIGITAL COMP CONTROL	2- 7	6	+ 1/4	+4.3
N	DIGITAL EQUIPMENT	46- 60	56 1/2	+2 7/8	+5.3
N	ELECTRONIC ASSOC.	2- 5	2 1/8	+ 1/8	+6.2
A	ELECTRONIC ENGINEER.	7- 16	8 3/8	- 3/8	-4.2
O	FOUR-PHASE SYSTEMS	13- 21	15 7/8	+ 5/8	+4.0
N	FOXBORO	28- 50	47 7/8	-1 1/8	-2.2
O	GENERAL AUTOMATION	4- 11	5 1/2	+1	+22.2
O	GRI COMPUTER CORP	1- 1	1/2	0	0.0
N	HEWLETT-PACKARD CO	80-117	93 5/8	+4 5/8	+5.1
N	HONEYWELL INC	34- 56	44 1/2	+ 1/2	+1.1
N	IBM	227-288	272	+2 5/8	+0.9
O	MANAGEMENT ASSIST	1- 8	7 5/8	+ 1/4	+3.3
O	MEMOREX	17- 33	21 1/8	+ 3/8	+1.8
O	MICRODATA CORP	10- 28	16	+ 1/8	+0.7
O	MODULAR COMPUTER SYS	3- 14	4 1/2	- 1/4	-5.2
N	NCR	24- 37	35	+1 1/8	+3.3
O	PRIME COMPUTER INC	4- 18	17 3/4	+3 1/4	+22.4
N	PERKIN-ELMER	19- 27	20 3/4	- 1/8	-0.5
N	RAYTHEON CO	45- 67	59	-2 3/4	-4.4
N	SPERRY RAND	40- 52	44 1/2	0	0.0
O	SYCOR INC	9- 31	12 3/4	+ 3/4	+6.2
A	SYSTEMS ENG. LABS	5- 10	6 1/4	+ 1/8	+2.0
N	VARIAN ASSOCIATES	12- 17	14	+ 1/2	+3.7
A	WANG LABS.	11- 20	14 3/4	- 1/8	-0.8

LEASING COMPANIES

EXCH		1976 RANGE (1)	CLOSE DEC 1 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	BOOTHE COMPUTER CORP	1- 8	7 3/8	+ 1/2	+7.2
O	COMDISCO INC	3- 10	9 1/4	- 1/4	-2.6
A	COMMERCE GROUP CORP	2- 3	1 5/8	- 1/8	-7.1
A	COMPUTER INVSTRS GRP	1- 3	1 3/8	0	0.0
M	DATRONIC RENTAL	1- 8	1 1/8	- 1/8	-10.0
A	DCL INC	1- 1	5/8	+	+10.0
N	DPF INC	5- 8	6 5/8	0	0.0
N	ITEL	6- 15	12 5/8	- 1/8	-0.9
N	LEASCO CORP	6- 20	20	+1 7/8	+10.3
O	LEASPAC CORP	0- 1	1/8	0	0.0
O	NRG INC	0- 1	1/8	0	0.0
A	PIONEER TEX CORP	6- 9	7 3/4	+ 1/4	+3.3
N	U.S. LEASING	7- 12	8 1/4	- 5/8	-7.0

SOFTWARE & EDP SERVICES

EXCH		1976 RANGE (1)	CLOSE DEC 1 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	1- 3	1 1/8	0	0.0
O	ANACOMP INC	6- 11	6 5/8	- 1/8	-1.8
A	APPLIED DATA RES.	2- 5	4 1/2	+ 5/8	+16.1
N	AUTOMATIC DATA PROC	17- 35	30	+ 1/2	+1.6
O	COLEMAN AMERICAN COS	2- 6	2 1/4	- 1/8	-5.2
O	COMPU-SERV NETWORK	3- 10	8 1/4	+ 1/4	+3.1
O	COMPUTER DIMENSIONS	3- 7	6 1/4	0	0.0
O	COMP ELECTION SYSTMS	5- 9	5 1/4	+ 1/4	+5.0
O	COMPUTER HORIZONS	1- 2	1 1/2	- 1/4	-14.2
O	COMPUTER NETWORK	2- 8	7	- 1/4	-3.4
N	COMPUTER SCIENCES	4- 8	6 1/2	+ 3/8	+6.1
O	COMPUTER TASK GROUP	1- 2	1 1/4	0	0.0
O	COMPUTER USAGE	3- 6	2 1/2	- 1/8	-4.7
O	COMSHARE	2- 9	6	0	0.0
O	DATA DIMENSIONS INC	2- 4	3 5/8	+ 5/8	+20.8
O	DATATAB	1- 2	1 1/2	0	0.0
N	ELECTRONIC DATA SYS.	12- 18	16 3/4	+1 3/8	+8.9
O	INFONATIONAL INC	1- 1	1/8	0	0.0
O	INSYTE CORP	1- 3	1 1/2	0	0.0
O	IPS COMPUTER MARKET.	1- 2	1	- 1/8	-11.1
O	KEANE ASSOCIATES	2- 4	2 1/8	- 5/8	-22.7
O	KEYDATA CORP	1- 5	1 1/4	- 1/2	-28.5
O	LOGICON	3- 7	7 1/8	+1 3/4	+32.5
A	MANAGEMENT DATA	1- 3	2	0	0.0
A	NATIONAL CSS INC	13- 25	19 7/8	+ 1/4	+1.2
O	NATIONAL DATA CORP	4- 7	4 7/8	0	0.0
A	ON LINE SYSTEMS INC	17- 22	20 3/8	+ 1/8	+0.6
N	PLANNING RESEARCH	3- 5	3 1/2	0	0.0
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 5	1 3/4	0	0.0
O	REYNOLDS & REYNOLD	13- 21	16 1/4	+ 1/2	+3.1
O	SCIENTIFIC COMPUTERS	1- 1	3/4	- 1/8	-14.2
O	TYMSHARE INC	14- 28	17	+ 1/2	+3.0
A	URS SYSTEMS	3- 5	3 1/2	0	0.0
N	WYLY CORP	1- 7	1 1/4	+ 1/8	+11.1

PERIPHERALS & SUBSYSTEMS

EXCH		1976 RANGE (1)	CLOSE DEC 1 1976	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	8- 13	10 5/8	+ 1/2	+4.9
O	ADVANCED MEMORY SYS	4- 10	6	0	0.0
N	AMPEX CORP	5- 10	6 5/8	+ 1/4	+3.9
O	ANDERSON JACOBSON	2- 4	2 7/8	0	0.0
O	APPLIED DIG DATA SYS	13- 25	16	0	0.0
O	BEEHIVE MEDICAL ELEC	3- 9	8 5/8	+ 1/8	+1.4
A	BOLT,BERANEK & NEW	7- 11	7 1/2	- 3/8	-4.7
N	BUNKER-RAMO	5- 10	7 1/4	+ 1/4	+3.5
A	CALCOMP	4- 7	4 1/2	- 1/8	-2.7
O	CAMBRIDGE MEMORIES	0- 6	1/2	0	0.0
N	CENTRONICS DATA COMP	20- 36	25	+1 7/8	+8.1
O	CODEX CORP	22- 42	30 1/2	+1	+3.3
O	COGNITRONICS	1- 1	7/8	+ 3/8	+75.0
O	COMPUTER COMMUN.	1- 6	4 5/8	- 1/8	-2.6
O	COMPUTER CONSOLES	4- 7	5	+ 1/4	+5.2
A	COMPUTER EQUIPMENT	1- 3	1 3/4	- 1/8	-6.6
O	COMPUTER TRANSCEIVER	1- 3	7/8	0	0.0
O	COMTEN	4- 9	8 1/2	+ 1/2	+6.2
N	CONRAC CORP	20- 25	23	+1 1/8	+5.1
O	DATA ACCESS SYSTEMS	1- 5	5	0	0.0
O	DATA 100	6- 13	6 7/8	+ 1/8	+1.8
A	DATA PRODUCTS CORP	5- 15	11 1/4	+ 1/8	+1.1
O	DATA TECHNOLOGY	1- 2	2	+ 1/8	+6.6
O	DATUM INC	1- 2	7/8	+ 1/8	+16.6
O	DECISION DATA COMPUT	1- 4	1 3/4	+ 1/4	+16.6
O	DELTA DATA SYSTEMS	1- 1	1/2	0	0.0
N	ELECTRONIC M & M	1- 4	3 1/4	+ 3/8	+13.0
O	FABRI-TEK	1- 1	7/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	3/8	0	0.0
N	HAZELTINE CORP	4- 12	8 1/2	- 1/4	-2.8
N	HARRIS CORP	34- 55	53 1/2	- 3/8	-0.6
A	INCOTERM CORP	9- 20	13 3/4	+2 1/8	+18.2
O	INFOREX INC	3- 7	4 3/8	- 1/8	-2.7
O	INFORMATION INTL INC	10- 18	11 5/8	- 1/2	-4.1
O	INTEL CORP	47-109	59	+5 1/2	+10.2
A	LUNDY ELECTRONICS	3- 7	3 7/8	0	0.0
O	MSI DATA CORP	3- 7	6	- 1/8	-2.0
A	MILGO ELECTRONICS	15- 22	20 1/2	0	0.0
N	MOHAWK DATA SCI	3- 10	5 3/8	- 1/2	-8.5
O	PENRIL CORP	1- 3	1 7/8	+ 1/8	+7.1
A	PERTEC CORP	3- 9	6 1/2	- 1/8	-1.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 10	2	0	0.0
O	QUANTOR CORP	4- 6	5 1/4	+ 3/4	+16.6
O	RECOGNITION EQUIP	6- 11	9 1/8	+ 1/8	+1.3
N	SANDERS ASSOCIATES	6- 11	8 3/8	- 1/8	-1.4
O	SCAN DATA	1- 4	1 1/8	-	-4.9
O	STORAGE TECHNOLOGY	9- 13	11	+ 1/2	+4.7
O	T BAR INC	5- 10	6 1/4	0	0.0
O	TALLY CORP.	4- 6	5 1/4	- 1/4	-4.5
O	TEC INC	3- 8	7 1/2	+1	+15.3
N	TEKTRONIX INC	45- 69	63 1/2	+1 1/8	+1.8
N	TELEX	2- 5	2 5/8	+ 3/8	+16.6
O	WANGCO INC	11- 22	21 1/8	0	0.0
O	WILTEK INC	2- 2	1 1/4	- 1/4	-16.6

SUPPLIES & ACCESSORIES

EXCH		1976 RANGE (1)	CLOSE DEC 1 1976	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED SYSTEMS INC	1- 4	3 3/8	0	0.0
O	BALTIMORE BUS FORMS	3- 5	3 1/2	- 1/8	-3.4
A	BARRY WRIGHT	6- 10	9 3/8	+ 3/8	+4.1
O	CYBERNATICS INC	0- 1	1/2	+	+14.1
A	DATA DOCUMENTS	25- 45	42 1/4	-3	-6.6
O	DUPLEX PRODUCTS INC	13- 24	12 7/8	+ 1/8	+0.9
N	ENNIS BUS. FORMS	6- 8	6	+ 1/4	+4.3
O	GRAHAM MAGNETICS	8- 13	11 1/4	+ 3/4	+7.1
O	GRAPHIC CONTROLS	13- 19	15 1/2	- 3/4	-4.6
N	3M COMPANY	53- 66	56 1/4	-2 1/4	-3.8
O	MOORE CORP LTD	32- 51	33 1/2	- 1/4	-0.7
N	NASHUA CORP	11- 19	18	+ 5/8	+3.5
O	STANDARD REGISTER	15- 19	17 1/4	- 1/4	-1.4
O	TAB PRODUCTS CO	5- 11	9 1/2	+ 1/2	+5.5
N	UARCO	19- 25	19 3/8	- 1/8	-0.6
A	WABASH MAGNETICS	4- 11	11 1/8	+ 7/8	+8.5
N	WALLACE BUS FORMS	19- 25	21 7/8	- 1/4	-1.1

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
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